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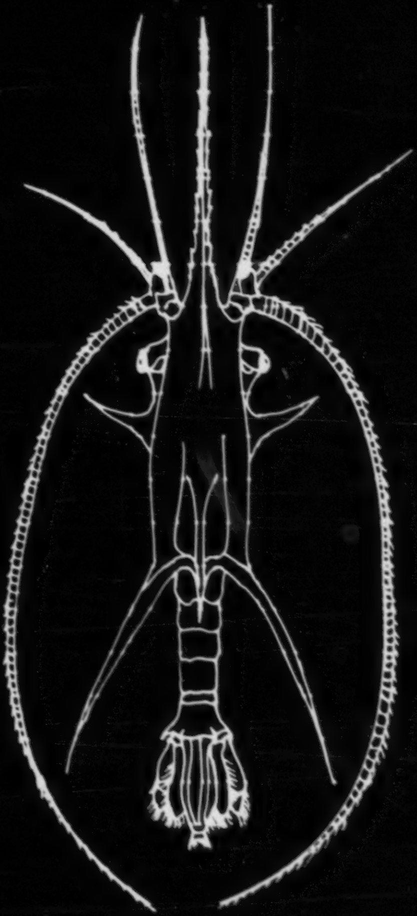
Identification Manual to the Mysidacea and Euphausiacea of the Northeast Pacific

R. D. Kathman • W. C. Austin • J. C. Saltman • J. D. Fulton



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Contents

Abstract/Résumé iv
Acknowledgements v

Introduction 1
    Purpose and Rationale 1
    Format 3
    Use of Tabular Keys 3
    Limitations 4

Glossary 5

Key to the Groups of Shrimplike Malacostracan Crustaceans 15
    Typical Shrimplike Crustaceans 15

MYSIDACEA 21
    Introduction 22
    Distribution and Ecology 24
    Reproduction and Growth Stages 25
    Morphology and Generalized Mysids 28
    Species Lists 29
    Key to the Mysidacea 33
    Key Group 1; Key ot the Mysids at the Suprageneric Level 34
    Key Group 2; Key to Genera in Tribes other than
      Mysini and Erythropini 39
        Key Group 21; Key to Species of *Gnathophausia* 43
        Key Group 22; Key to Species of *Eucopia* 45
        Key Group 23; Key to Species of *Boreomysis* 49
    Key Group 3; Key to Genera in Tribe Erythropini 53
        Key Group 31; Key to Species of *Pseudomma* 57
    Key Group 4; Key to Genera in Tribe Mysini 59
        Key Group 41; Key to Species of *Exacanthomysis* 65
        Key Group 42; Key to Species of *Holmesimysis* 67
        Key Group 43; Key to Species of "*Acanthomysis*" cf. *Paracanthomysis* 71
        Key Group 44; Key to Species of *Mysis* 73
        Key Group 45; Key to Species of *Neomysis* 77
    Diagnoses and Illustrations of the Mysidacea (alphabetically arranged) 79
Index 239

EUPHAUSIACEA 247

    Introduction 248
    Distribution and Ecology 250
    Reproduction and Growth Stages 253
    Morphology of Generalized Euphausiid 257
    Species List 258
    Keys to the Euphausiacea 259
    Key Group 1; Key to the Genera of Euphausiids 260
    Key Group 2; Key to Species of *Thysanopoda* 264
    Key Group 3; Key to Species of *Euphausia* 266
    Key Group 4; Key to Species of *Thysanoessa* 270
    Key Group 5; Key to Species of *Nematoscelis* 274
    Key Group 6; Key to Species of *Stylocheiron* 276
    Diagnoses and Illustrations (alphabetically arranged) 279
Index 367

Bibliography 371
Appendix A — List of Specimens Used for Verifications 393
Appendix B — Additional Information on Mysid Morphology and Identification 397
Appendix C — Petasmae of Euphausiids from the Northeast Pacific 405

Abstract

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This publication contains tabular keys, diagnoses and illustrations to the 48 species of mysids and the 23 species of euphausiids reported from the Northeast Pacific, from northern California to northern Alaska. Part I, the Mysidacea, and Part II, the Euphausiacea, each include generalized morpholigies, taxonomic keys, generic and specific diagnoses, illustrations, and an index. The glossary and bibliography are each combined for both groups.

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Acknowledgements

We give our sincere thanks to the many people who contributed their time and assistance to make this publication possible. Our reviewers, Thomas Bowman, Edward Brinton, Linda Gleye, John Mauchline and Masaaki Murano, deserve special thanks for the invaluable comments which have made this a much more valuable product.

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Deedee Kathman was primarily responsible for the euphausiid section and for all of the editorial decisions for the entire manuscript. Bill Austin was primarily responsible for the mysid section. Jane Saltman produced all the illustrations and contributed to both sections. John Fulton provided advice, specimens and most of the literature for the euphausiid section.

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INTRODUCTION

Purpose and Rationale

This manual is designed to provide sufficient information to accurately identify mysids and euphausiids which have been recorded from British Columbia and adjacent regions. Species reported south to San Francisco, California, north to Kodiak Island, Alaska and seaward approximately 370 kilometers have been included (Figure 1). This area might be categorized zoogeographically as the coastal and adjacent oceanic part of the cold temperate Northeast Pacific.

In the past few years both euphausiids and mysids have come to the attention of an increasing number of scientists, fisheries personnel and lay people. Species in both groups may serve as a major food source for some marine fish, mammals (especially whales), and as a food source or supplement for terrestrial vertebrates including man.

Despite increasing interest in these groups the identification of many species in the Northeast Pacific has been hampered by descriptions in several languages which are scattered through a large literature. Dichotomous keys such as that to species of euphausiids by Mauchline and Fisher (1969), and to genera of mysids by Mauchline (1980) are useful but often not sufficient, particularly where only one sex is available or structures are missing.

The two groups are treated together here as a matter of convenience and history. For a number of years mysids and euphausiids were allied in the Taxon Schizopoda. It is now recognized that many of their similarities are superficial but a number of specialists have continued to work with both groups.

With few exceptions the descriptions and illustrations are drawn from the literature. However, specimens of most species were examined to confirm certain features; these are listed in Appendix A. Taxonomic problems are identified but were left unresolved, as this was beyond the focus of the present work.

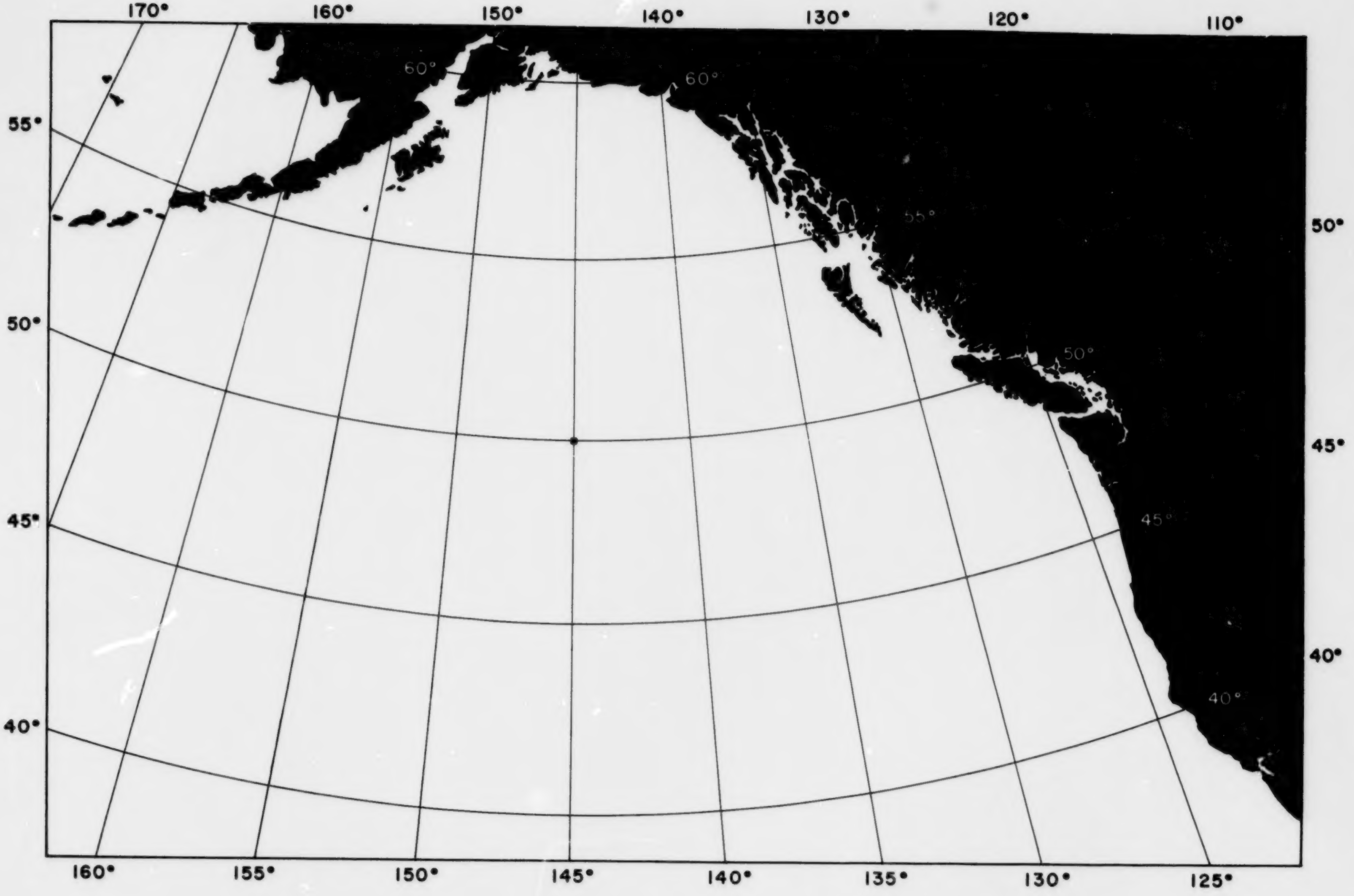
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Figure I. Geographical limits of the study area.

Format

A general section on identification procedures is given for each group. We recommend that the nonspecialist review this section and the combined glossary before proceeding to use the keys. Keys are in a tabular format for each group. Their use is discussed in detail in the next section.

The generic and specific diagnoses include key and additional characters which may be useful in confirming an identification. They have been arranged alphabetically by genus for convenience; correct phylogenetic order can be found in the Species List. Illustrations for each species are generally arranged in a standard order to facilitate comparisons. Since they are based on numerous different sources, style necessarily varies. Only functional eyes are shaded, and plumosities of setae and setae are usually omitted. Serrated margins denote the presence of setae. The source for each figure, indicated by a number following each figure legend, is keyed to the references. The figures and written characterization are meant to provide enough information for accurate identification, rather than to comprise a complete systematic description. References, including those describing synonyms, are noted for those who wish to obtain additional taxonomic information.

The two separate indices cover all taxa discussed in this manual including synonyms. Binomens are listed by specific epithet as well as by generic name.

The bibliography combines references in both groups.

Use of Tabular Keys

Tabular keys permit the inclusion of characters which may or may not be present in a particular specimen such as color, behavior or a feature limited to one sex. We suggest referring to one of the tabular keys as an example for the following discussion.

The system employed in this manual presents a list of characters. Two or more statements are given for each character. These may be a simple truth value statement such as Yes or No; a statement requiring a numerical answer such as 1 or 2; or a descriptive statement such as Oblique or Straight. In each case a symbol is given to denote that statement, generally in the form of a recognizable abbreviation such as Y for Yes and N for No, or OB for Oblique and ST for Straight. When the symbols are put together in the order that the characters are given they form a codon such as Y 1 OB or N 2 ST.

A codon determined from a specimen can then be matched with the codon given for each taxon in the associated tabular key. The keys are designed so that if all characters are assessed, each taxon has a unique codon. Where possible, sufficient characters are employed so that this would be true even if not all characters were available in assessing a specimen. However, if all characters cannot be assessed, the codon may fit several taxa. Alternatively, if the specimen represents a taxon not included in the key, the codon may not fit any taxa or may fit several taxa with a resultant erroneous determination. Identifications can be confirmed by carefully checking the description and accompanying illustrations.

The key groups may be arranged in a hierarchical series. The determination of a taxon in the first key group (KG1) leads to one of several secondary key groups (KG 2-4) which in some cases may lead to tertiary key groups (KG 21-45). Page numbers follow each taxonomic determination in the tabular keys.

Limitations

The pelagic and hyperbenthic fauna, particularly of deep water, is not well known off the British Columbia coast. Unidentified samples may contain species not included in this handbook. For example, one existing species and a number of new mysid species found off the Oregon coast (Murano and Krygier, 1985) were not identified in time to be drawn and included in these keys although they are noted in square brackets in the species list. The reader is urged to consult this publication during identifications.

Larval forms of euphausiids which differ from adults have been treated only briefly due to paucity of information. Juvenile mysids typically but not universally appear as miniature adults lacking certain sexual characters; however, they may differ in relative size of structures. Specimens with missing or abnormal structures may not fit the keys.

GLOSSARY

Terms given below are defined as they pertain to mysids and euphausiids and may have different or modified usage elsewhere. Terms in brackets are not employed in this handbook but may be encountered in some of the references cited. They are included for the convenience of the user. Refer to root words for those composite terms which are not separately defined.

Abdomen. The region behind the cephalothorax; the posterior part of the body.

Abdominal somite. A single body division of the abdomen.

Acuminate. Tapering to a point.

[**Aesthete**]. Esthete.

[**Ambulatory leg**]. Pereopod.

Anamorphic. Pertaining to addition of somites and associated structures which are added to the body after hatching (e.g., in Euphausiacea).

Antenna (pl. antennae). One of paired appendages on the second cephalic somite on all arthropods (= 2nd antenna).

Antennal scale. Flattened process attached laterally to the antennal penduncle (i.e., at the base of the antenna). Setae may fringe all or portions of the scale, and a distal suture is sometimes present

Antennal spine. Spine on anterior margin just below the eye orbit.

Antennule. One of paired appendages on the first cephalic somite on all arthropods (= 1st antenna).

Apodeme. Infold of the exoskelton for attachment of muscles.

Appendix masculina. Complex median process of second pleopodal endopod of males used in copulation or spermatophore transfer.

Arborescent. Treelike branching.

Article. Subdivision of an appendage (cf. segment).

Baling lobe. Structures on some oostegites believed to create currents through the marsupium; reduced oostegites may serve same function.

[**Basipodite**]. Basis.

Basis. Second article of appendage from proximal end, adjacent to coxa; carries exopod and/or endopod when present.

Bathypelagic. Pertaining to the organisms or zone in the open ocean deeper than 1000 m below the surface.

Benthic. Organism(s) or habitat on or in the bottom of a water body.

Biramous. (An appendage) Having two branches.

[**Branchia**]. Gill.

Branchiostegal spines. Carapace spines on or close to anterior margin medially between antennal and pterygostomial spines.

Buccal cavity. The area of the cephalon containing the mouthparts.

Calyptopis. Third larval stage; carapace distinct, body segmented, cephalic appendages present, eyes compound, pereopods and pleopods absent (in Euphausiacea).

Carapace. Hardened cuticular extension from the posterior cephalic margin covering all or part of the cephalothorax.

Caridoid facies. That group of characters distinguishingsome eumalacostracan crustaceans: enclosure of the thorax by a carapace, movable stalked eyes, biramous antennules, antennae with antennal scales, pereopods with natatory exopods, ventrally flexed abdomen, and tailfan.

[**Carina**]. Keel.

[**Carpopod(ite)**]. Carpus.

Carpo-propodus. Fused carpus and propodus, often with secondary subsegments. Sometimes referred to as simply the propodus (e.g. Banner, 1948; W. Tattersall, 1932) or sometimes with the dactyl also included (e.g. Holmquist, 1982).

Carpus. Fifth or sixth segment from the proximal end of a seven or eight segmented thoracopod.

Caudal. Pertaining to the tail region.

[**Caudal fan**]. Tailfan.

[**Caudal furca**]. Furca.

Cephalic. Pertaining to the cephalon.

Cephalon. Anteriormost tagma, bearing eyes, mouth, two pairs of antennae, and three pairs of mouth parts.

Cephalothorax. Anterior part of body, composed of fused cephalon and thorax.

Cervical groove. Anterior groove in carapace posterior to rostrum.

Chela (pl. chelae). Appendage modified to form an apically directed pincer at distal end of some pereopods.

Chelate. Bearing a chela.

Cheliped. Thoracopod bearing a chela.

Chromatophore. Special structure in the dermis containing pigment which can be concentrated or dispersed.

Compound eye. Array of contiguous tapering units (ommatidia) having a common optic nerve trunk.

[**Cormopod(ite)**]. Thoracopod.

Cornea. Transparent cuticle of ommatidia of compound eye.

Coxa. Basal segment of appendage adjoining sternite.

[**Coxopod(ite)**]. Coxa.

Coxepipod(ite) . Exite of coxa.

Crystalline cone. An accessary lens located below the cornea of the ommatidium.

Cyrtopia. Formerly considered a fifth larval stage where antennae no longer used in locomotion; currently included in furcilia stage (in Euphausiacea).

Dactyl. Terminal segment of a thoracopod.

[**Dactylopod(ite)**]. Dactyl.

Denticle. A small tooth or tooth-like prominence.

Distal. Toward the free end; away from the point of attachment of an appendage.

Dorsal. The upper side or back.

[**Ecdysis**]. Molting.

Endite. Inwardly or medially directed process or lobe on the basal margin of an appendage.

Endobenthic. Hypobenthic.

Endognath. Endopod of a maxilliped.

Endopod(ite). Inner ramous of a biramous appendage.

Epibenthic. Benthic organism(s) or habitat on, rather than in, the bottom deposit of a water body.

[**Epimere**]. Pleura.

[**Epimeron**]. Epimere.

Epimorphic. Pertaining to complete development of the body and appendages prior to emergence from marsupium except for increase in size and addition of reproductive structures (e.g., in Mysidacea).

Epipod(ite). Laterally directed process arising from a protopod (i.e., an exite) which typically has a respiratory function.

Epistome. Plate at the anterior edge of the buccal cavity; between the labrum and the bases of the antennae.

Esthete. Chemosensory seta covered by thin cuticle.

Exite. Laterally directed process arising from a protopod.

Exopod(ite). Outer ramus of a biramous appendage.

Exoskeleton. Chitinous or calcified outer integument of crustaceans.

Eyestalk. Peduncle articulated with the cephalon bearing a compound eye at the distal end.

[**First Antenna**]. Antennule.

[**First Maxilla**]. Maxillule.

Flagellum (pl. flagella). Multiarticulate portion of an antennule, antenna or exopod.

[**Foregut**]. Stomodeum.

Frontal region. Anteromedial part of the carapace including the rostrum and region behind it.

Furca (pl. furcae). One of the paired caudal rami.

Furcilia. Larval phases marked by movable compound eyes projecting beyond the margin of the carapace; antenna not used for locomotion (in Euphausiacea).

Gastric region. Median part of the carapace anterior to cervical groove and posterior to the frontal region.

Geniculate. Bent sharply.

Gill. Thin-walled fingerlike, treelike or leaflike respiratory structure extending outward from the base of an appendage.

Gnathobase. Endite used to manipulate food.

Gnathopod. Prehensile (typically chelate or subchelate) thoracopod.

Gonopod. Pleopod modified for reproductive purposes.

Gonopore. External outlet for genital products.

Hair tuft. A cluster or group of hairs growing closely together.

[**Head**]. Cephalon.

[**Hindgut**]. Proctodeum.

Hyperbenthic. Pertaining to organism(s) or habitat near the bottom deposit of a water body.

Hypobenthic. Pertaining to organism(s) or habitat in, rather than on, the bottom deposit of a water body.

Incisor process. Serrated sharp ridge of distal margin of a mandible.

[**Incubatory lamella**]. Oostegite.

Inferior margin. Lower edge.

[**Ischiopod(ite)**]. Ischium.

Ischium. Segment distal to either the basis or preischium of the endopod of a thoracopod.

Joint. Often used to denote segment itself, rather than area where segments are joined.

Keel. Elevated ridge.

Knee. Flexure between the merus and carpus.

Labium. Lower lip posterior to mandibles.

Labrum. Upper lip anterior to mouth. In mysids, a flat plate typically rounded posteriorly and either rounded or pointed anteriorly.

Lacinia mobilis. Chitinous movable process articulated with incisor process of mandible.

Lappet. Ventrally projecting subdivisions of the epimeres; dorsal projections of the antennules in some euphausiids.

[**Length**] See size.

Linguiform. Tongue-like.

[**Lower lip**]. Labium.

Mandible. One of the third pair of cephalic appendages (excluding eyes), or the first pair of feeding appendages.

Mandibular palp. Articulated process lateral to incisor process of mandible, used in feeding or cleaning.

Marsupium. Brood pouch on ventral surface of adult female (in mysids).

Maxillary gland. Excretory organ in maxillary somite with a duct opening on the maxilla.

Maxillule. One of the pair of fourth cephalic appendages (excluding eyes), or one of the pair of second feeding appendages (= first maxilla); each with a proximal and distal lobe with spines.

Maxilla (pl. maxillae). One of the pair of fifth cephalic appendages, or one of the pair of third feeding appendages (= second maxilla).

Maxilliped. One of the paired appendages modified for feeding located on the first to third thoracic somites.

[**Meropod(ite)**]. Merus.

Merus. Segment distal to the ischium of the endopod of a thoracopod.

Mesopelagic. Pertaining to the organisms or zone at mid-depths of open ocean, usually between 200 and 1000 m.

Metanauplius. Second larval stage when first pereopods and eyes are rudimentary, mandibles are reduced, and organism is nonfeeding (in Euphausiacea).

[**Metastome**]. Labium.

Molar process. Grinding portion of gnathal lobe of mandible.

Molting. Periodic shedding of exoskelton to permit an increase in size and/or change in form.

Mysis stage. Larval stage in the development of some decapods which resembles a mysid.

Nail. Apical spine on the dactyl.

Natatory. Pertaining to swimming.

Nauplius (pl. nauplii). First larval stage with only three pairs of appendages: antennules, antennae and mandibles.

Neritic. Nearshore.

Oceanic. Offshore.

Ocellus (pl. ocelli). An eyespot.

Ocular papilla. Projection on the anterior margin of the eyestalk.

[**Ocular penduncle**]. Eyestalk.

Ommatidium (pl. ommatidia). One of many discrete optical units of a compound eye.

Oostegite. Inner medially directed platelike process arising from coxa of pereopod in female; part of the marsupium (mysids).

Oviduct. Passageway from ovary to genital opening.

Palp. Segmented or unsegmented process associated with mouth parts.

Papilla. Small conical projection.

Paragnath. One of two lobes of cleft labium.

[**Pars incisiva**]. Incisor process on mandible.

[**Pars molaris**]. Molar process on mandible.

Pectinate. Comb-like; with small tooth-like projections.

Peduncle. Stalk.

Peg. Modified seta on some gonopores (also, filament).

Pelagic. Pertaining to the organism(s) or habitat within bodies of water.

Penis (pl. penes). Male copulatory organ.

Penultimate. Second or next to last.

Peraeopod . Pereopod.

Pereon. Portion of trunk bearing the thoracopods, excluding the maxillipeds.

[**Pereopod**]. A thoracic appendage used in locomotion.

Petasma. Modification of the endopod of the first and second male pleopods, used in copulation (Euphausiacea).

Photophore. Light-producing structure.

Planktonic. Pertaining to pelagic organisms which are dependent on currents for distribution and movement.

[**Pleomere**]. Abdominal somite.

[**Pleon**]. Abdomen.

Pleopod. One of a pair of abdominal appendages, typically modified for swimming; present on one or more of the first 5 abdominal segments.

Pleuron (pl. pleura). Flattened lateral or ventrolateral extension of a somite.

[**Pleural plate**]. Pleura.

Plumose. Feathery; having plumes or tufts.

Podobranch. Gill arising from coxa of pereopod.

[**Podomere**]. Segment.

Preischium. Segment of endopod between protopod and ischium.

Process masculinus. Conical lobe on third segment of antennular peduncle of some males (mysids; setose in adults).

Proctodeum. Posterior part of alimentary canal lined with cuticle.

Propodus. Penultimate segment of thoracopod.

Protopod(ite). Proximal part of appendage consisting of coxa and basis.

Proximal. Toward or near the point of attachment; away from the free end.

Pseudobranchial lobe. Lobe replacing false or accessory gill.

Pseudochela. Superficially resembling a chela, but not of functional value.

Pterygostomial. On anterolateral angle.

Ramus (pl. rami). Branch of an appendage or other structure.

Reniform. Kidney-shaped.

Rostrum. Anteriorly projecting median extension of the carapace between the eyes.

[**Scale**]. Antennal scale.

Scaphocerite . Antennal scale.

Schizopoda. Obsolete term for Mysidacea and Euphausiacea combined.

Schizopod larvae. Obsolete term for larvae of mysids and euphausiids.

[**Schizopod larvae**]. Mysis stage.

[**Second antenna**]. Antenna.

[**Second maxilla**]. Maxilla.

Segment. Unit of appendage connected by a movable articulation to adjacent segments or to the body; also, a division of the body (=somite).

Seminal receptacle. Diverticulum of an oviduct or an external pouch in the female for storing spermatozoa.

Seminal vesicle. Sac in male for storage of spermatozoa.

Seta (pl. setae). Hair-like or needle-like projection articulating with or protruding through cuticle.

Setose. Bearing setae.

Size. The distance from the anterior margin of the carapace, excluding the rostrum, to the tip of the telson. If total size is also given, it includes the rostrum. Some systematists (e.g. Sars) gave measurements based on the distance from the tip of the antennal scale to the end of the telson, while others use the distance from the anterior margin of the rostrum to the end of the abdomen excluding the telson.

Somite. Division of the body, usually bearing a pair of appendages.

Spermatophore. Packet or capsule of spermatozoa.

Spermatozoan (pl. spermatozoa). Male gametes or sperm.

Spine. Stiff, pointed, external projection.

Spinule. Small spine.

[**Squama**]. Antennal scale.

Statocyst. An organ of equilibrium, providing a sense of balance, located on the endopods of the uropods in most Mysidacea.

Statolith. Calcarious body within a statocyst, which presumably responds to gravity.

Sternal process. Knob, spine or fingerlike projection from midsection of sternite.

Sternite. Sclerotized ventral surface of body somite.

Sternum. Chief ventral plate of the body segments.

Stomodeum. Anterior part of alimentary canal lined by cuticle.

Styliform. Ending in a long, slender point.

Subchela. Prehensile appendage formed by folding back of dactyl against propodus, or by propodus folding back against carpus.

Subchelate. Bearing a subchela.

Sulcus. A groove or furrow.

Superior margin. Upper edge.

Supraorbital. Above the eye.

Suture. Line or junction between two plates.

[**Sympod**] Protopod.

Tagma (pl. tagmata). General body divisions, each consisting of a number of somites.

Tailfan. Posterior swimming structure composed of telson and laterally expanded uropods.

Tarsus (pl. tarsi). Segments of a leg distal to the merus.

Telson. Terminal articulated portion of body, usually bearing the anus at its base.

[**Tergal fold**]. Epimere.

Tergite. Sclerotized dorsal surface of a somite.

Thelycum. Female copulatory organ located near the oviducts.

Thoracic. Pertaining to the thorax.

Thoracic appendage. Appendage attached to somite of the thorax; includes both pereopods and maxillipeds.

Thoracopod(ite). A thoracic appendage. All mysids and euphausiids carry 8 pairs, although some may be modified or reduced. The nomenclature of these appendages has varied according to perceived function. The 1st pair are always adapted for feeding and have been referred to as maxillipeds. The 2nd pair may function both in feeding and locomotion, and have been termed gnathopods or maxillipeds. The 3rd pair have been called gnathopods, maxillipeds or pereopods. We follow most modern systematists, using the general designation thoracopod and numbering these 1-8 starting at the anteriormost segment. Those referring to earlier literature may encounter the above inconsistencies (e.g., the 3rd thoracopod is the 1st true leg according to Sars but the 2nd leg according to Hansen).

Thorax. Anterior portion of trunk.

Truncate. Having a flattened, square, or even end.

Trunk. Body posterior to cephalon.

[**Upper lip**]. Labrum.

Uropod. A biramous lateral appendage at the posterior end of the abdomen.

Ventral. Pertaining to the lower side.

[**Vesicula seminalis**]. Seminal vesicle.

[**Walking leg**]. Pereopod.

Zoea. Larval stage characterized by swimming exopods on some or all thoracic appendages; pleopods absent or rudimentary (does not apply to mysids or euphausiids).

KEY TO THE GROUPS OF SHRIMPLIKE MALACOSTRACAN CRUSTACEANS

CARAPACE: present

Y : Yes
N : No

EYES: stalked or sessile when present

St : Stalked
Se : Sessile

ANTENNAL SCALE: present

Y : Yes
N : No

THORACIC APPENDAGES: biramous

Y : Yes; at least some appendages biramous
N : No; none biramous

THORACIC GILLS: if present, gills are exposed

Y : Yes
N : No

MAXILLIPEDS: number present

Number listed represents number of pairs of maxillipeds present

MARSUPIUM: present in mature females

Y : Yes
N : No

ABDOMINAL SEGMENTS: number

Number listed represents number of abdominal segments present

ABDOMINAL GILLS: present

Y : Yes
N : No

TAILFAN: present

Y : Yes
N : No

UROPODS: number

Number listed represents number of uropods present

STATOCYST: present on uropods

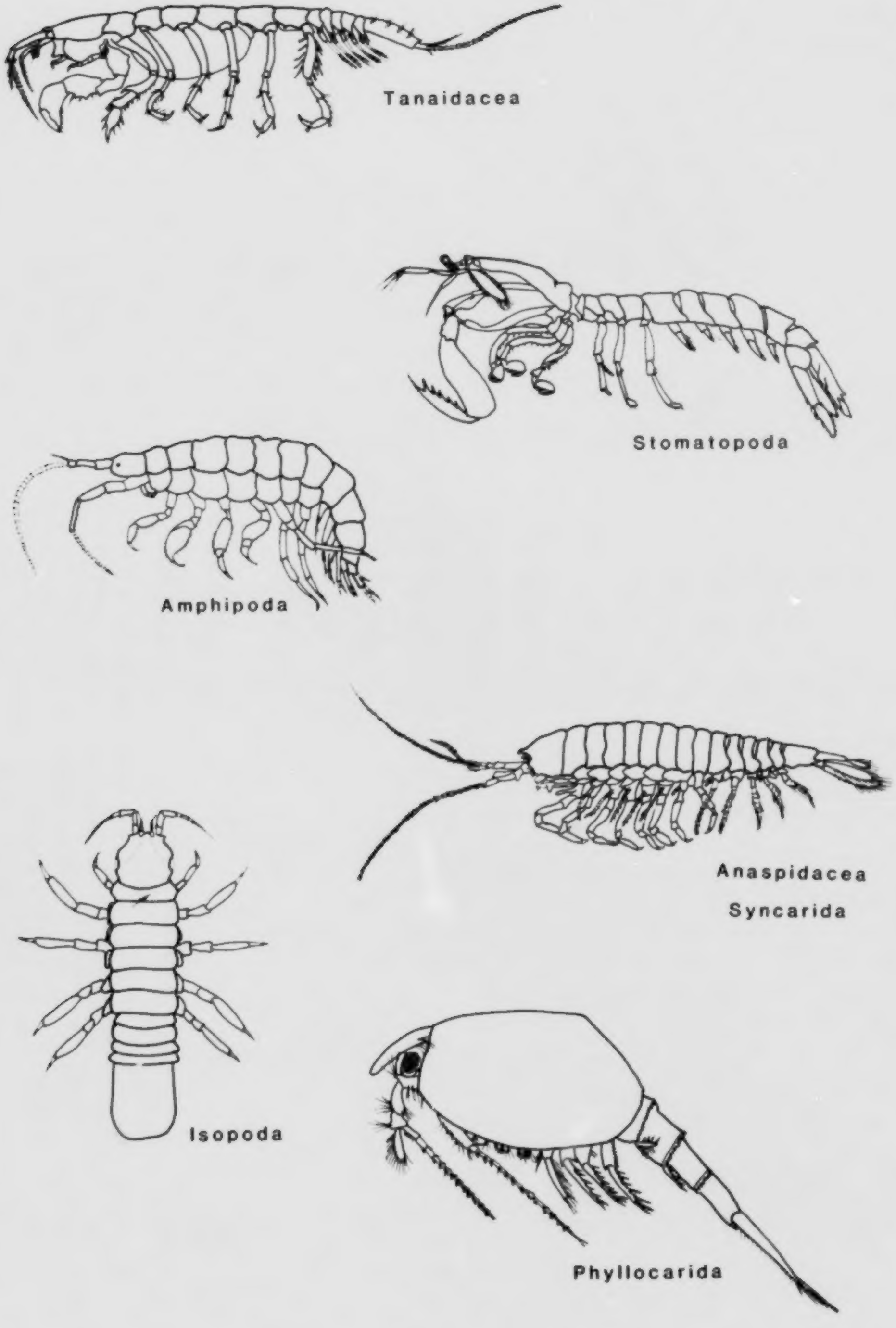
Y : Yes
N : No

BODY SHAPE: general shape of most species is laterally compressed or dorsoventrally compressed

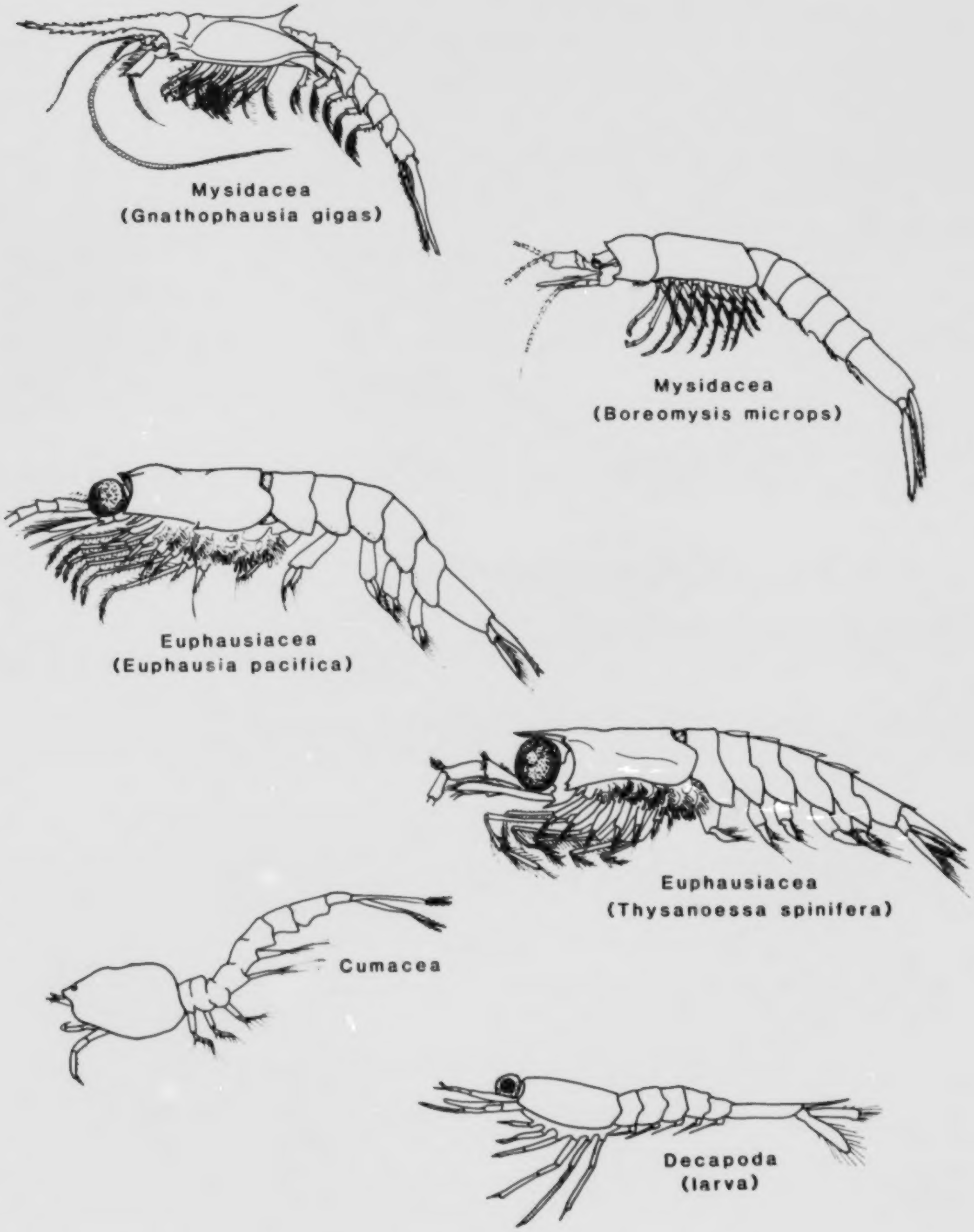
Lc : Laterally compressed
Dv : Dorsoventrally compressed

CARAPACE: present	EYES: ab, st, se	ANT. SCALE: present	THOR. APP.: biramous	THOR. GILLS: biramous	MAXILLIPEDS: number	MARSUPIUM: present	ABD. SEG.: number	ABD. GILLS: number	TAIL FAN: present	UROPODS: number	STATOCYST: on uropod	BODY: shape	
Y	St	N[a]	Y	N	0	N	8	N	N	0	N	Lc	Phyllocarida
N	St	Y	Y	Y	1	N	6	N	Y	1	N	Lc	Syncarida (freshwater)
Y	St	Y	Y/N	N	0	N	6	Y	Y	1	N	Dv	Hoplocarida
Y	St	Y	Y	Y/N	1-2	Y	6(7?)	N	Y	1	Y/N	Lc	Mysidacea
Y	Se	N	Y/N	N	3	Y	6	N	N	1	N	Lc	Cumacea
Y	St	Y	Y/N	N	1	Y	6	N	N	1	N	Dv	Tanaidacea
N	Se	N	N	N	1	Y	6	Y	N	1	N	Lc/Dv	Isopoda (free living forms)
N	Se	N	N	N	1	Y	6	N	N	3(0)	N	Lc	Amphipoda
Y	St	Y	Y	Y	0	N	6	N	Y	1	N	Lc	Euphausiacea
Y	St	Y	Y/N	N	3	N	6	N	Y	1	N	Lc/Dv	Decapoda

[a] Antennular scale present
/ = OR; could be either choice; e.g., Y/N = yes or no
( ) = uncommon or rare; e.g., 3(0) = usually 3, rarely 0


Tanaidacea
Stomatopoda
Amphipoda
Anaspidacea
Syncarida
Isopoda
Phyllocarida

Typical shrimplike crustaceans



Mysidacea
(Gnathophausia gigas)

Mysidacea
(Boreomysis microps)

Euphausiacea
(Euphausia pacifica)

Euphausiacea
(Thysanoessa spinifera)

Cumacea

Decapoda
(larva)

Typical shrimplike crustaceans

PART I

MYSIDACEA

MYSIDACEA

Introduction

The mysids comprise a group of approximately 780 known species with a worldwide distribution in marine habitats and to a limited degree in freshwater habitats. The fossil record extends back to the Mississippian period. They are shrimplike in appearance and in the past have been variously allied with the euphausiids, stomatopods, nebaliaceans and some decapods. They are now generally considered to be a crustacean Order in the Superorder Peracarida. Their common name of opossum shrimp refers to the presence of a brood pouch or marsupium in mature females which is common to all peracaridans. The history of our understanding of the group is reviewed by Tattersall and Tattersall (1951).

Mysidae is the largest Family in the Mysidacea and includes all but a few local species. All members of this family have a prominent statocyst on the endopod of each uropod, a useful diagnostic characteristic not found in any other crustacean group. The three other Families represented in the Northeast Pacific, Lophogastridae, Eucopiidae and Petalophthalmidae, lack uropod statocysts and include only deep water species. The two remaining Families, Lepidomysidae and Stygiomysidae, have members restricted to caves and wells, and have not been found north of Mexico. For a detailed account of mysid morphology, and procedures for collection and identification of mysids, the reader is referred to Appendix B.

Work on mysids from the coast received its impetus from the collections made by the United States Fish Commission aboard the steamer "Albatross" from 1888 to 1914. Initial reports include those of Faxon (1893, 1895) and Ortmann (1894, 1908). Much later W. Tattersall (1951) described additional species from the "Albatross" material. Also during the earlier period, nearshore and shallow water collections were made by a number of biologists in California and were reported by Holmes (1895, 1897, 1900), Esterly (1914) and W. Tattersall (1932). W. Tattersall (1933) also described mysids collected from western Canada by E. Berkeley, Wailes and others of the Pacific Biological Station and the University of British Columbia. Walker had earlier reported (1898a) on one mysid collected during W.A. Herdman's visit in the Puget Sound and Victoria areas the previous year. In a series of papers (1948a, 1948b, 1954b, 1954c, 1954d) Banner described several new species and summarized our knowledge of the group in the Northeast Pacific. Little additional systematic information on west coast mysids was published for a period of over 20 years although the initial paper and thesis by Clarke (1961, 1962) showed promise of additional valuable studies before his untimely death. From 1973 to 1982 Holmquist published a number of papers on nearshore and shallow water mysids collected by her and by E.L. Bousfield in British Columbia and Alaska. Gleye, alone and with Bacescu (1979, 1981, 1982), has published new information on shallow water mysids in California; and Murano and Krygier (1985) report on a number of new species collected in deep water off Oregon by Pearcy and his colleagues.

About one-third of the mysids occurring on this coast were initially described elsewhere and about one-half have a range extending into other seas. The following references, in addition to those given above and with the diagnoses, might be the most useful for those who wish to obtain more information than given in this handbook:

1. the dated but still useful Challenger Report by G.O. Sars (1885a);
2. the review of British Mysidacea including a review of general morphology by Tattersall and Tattersall (1951);
3. the Family Mysidae in the Fauna Japonica by Ii (1964);
4. the review of mysid biology and systematics including a key to genera by Mauchline (1980);
5. a series of papers reviewing genera in the tribe Erythropini with emphasis on Northwest Pacific species by Murano (1974, 1975, 1976, 1977a, 1981); and
6. for those who read Russian, papers by Birstein and Tchindonova (1958, 1970).

Distribution and Ecology

Mysids live in a variety of marine environments including the epi-, meso- and bathypelagic oceanic regions; the pelagic, hyperbenthic and benthic intertidal and subtidal coastal areas; and in estuaries. Some species live in freshwater and a few are troglobitic. General habitats for species on our coast are listed in Table I.

Mauchline (1980) has reviewed many aspects of the ecology and behavior of mysids and the following brief notes are largely based on this source and on the proceedings from a symposium in 1981 devoted to mysid ecology (Morgan, 1982).

Many mysids move from one habitat to another. Some burrow into the sand or rest on the bottom during the day but swim above the bottom at night; others may live in algae during the day but move into the open to feed at night. Many pelagic species exhibit diel migration, rising toward the surface at night and sinking to deeper water during the day. Vertical and horizontal distribution may vary with the size or sex of individuals within a species.

Most mysids are free living but a few, including a number of Heteromysis species, live in association with other organisms such as sea anemones and hermit crabs. Some species form dense shoals several meters deep, many meters long and at a precise distance from the bottom. During the tidal cycle shoals may breakup and later reform at the same precise location (Dadswell, 1975).

Mysids swim using the thoracopod exopods. Swimming speed has been measured in only a few species where it ranges from 1 to 20 cm/sec (Mauchline, 1980). Mysids can often avoid samplers, and it is a common experience of divers to see shoals rapidly parting in front of them. These behavioral and ecological characteristics have resulted in undersampling both populations and habitats. Apparent frequency of occurrence, population size, sex ratios and size classes based on some sampling procedures may not reflect the true situation in the field.

The recorded distribution for most mysids included in this handbook may well be enlarged with additional collecting, as well as by identifying material in existing collections.

Table 1. General habitats of mysids from the Northeast Pacific.

	Oceanic	Neritic	Littoral	Freshwater
"Acanthomysis" borealis		x		
"Acanthomysis" stelleri		x		
"Acanthomysis" columbiae		x		
Alienacanthomysis macropsis		x		
Amblyops abbreviata	x	x		
Archaeomysis grebnitzkii			x	
Boreomysis arctica	x			
Boreomysis californica	x			
Boreomysis inermis	x			
Boreomysis sp. (*rostrata* complex)	x			
Caesaromysis hispida	x			
Ceratomysis spinosa	x			
Columbiaemysis ignota		x		
Disacanthomysis dybowskii		x		
Euchaetomera tenuis	x			
Euchaetomeropsis pacifica	x			
Eucopia australis	x			
Eucopia grimaldii	x			
Eucopia sculpticauda	x			
Eucopia unguiculata	x			
Exacanthomysis alaskensis	x			
Exacanthomysis arctopacifica		x		
Exacanthomysis davisi		x		
Gnathophausia gigas	x			
Gnathophausia ingens	x			
Heteromysis odontops		x		
Holmesiella anomala		x		
Holmesimysis costata		x		
Holmesimysis nuda		x		
Holmesimysis nudensis		x		
Holmesimysis sculpta		x		
Holmesimysis sculptoides		x		
Inusitatomysis insolita	x	x		
Meterythrops robusta		x		
Mysidella americana		x		
Mysis litoralis			x	x
Mysis relicta				x
Neomysis kadiakensis		x		
Neomysis mercedis			x	x
Neomysis rayi		x		
Pacificanthomysis nephrophthalma		x		
Petalophthalmus armiger	x			
Proneomysis wailesi		x		
Pseudomma berkeleyi	x	x		
Pseudomma truncatum	x	x		
Stilomysis grandis		x		
Teraterythrops robusta		x		
Xenacanthomysis pseudomacropsis		x		

Reproduction and Growth Stages

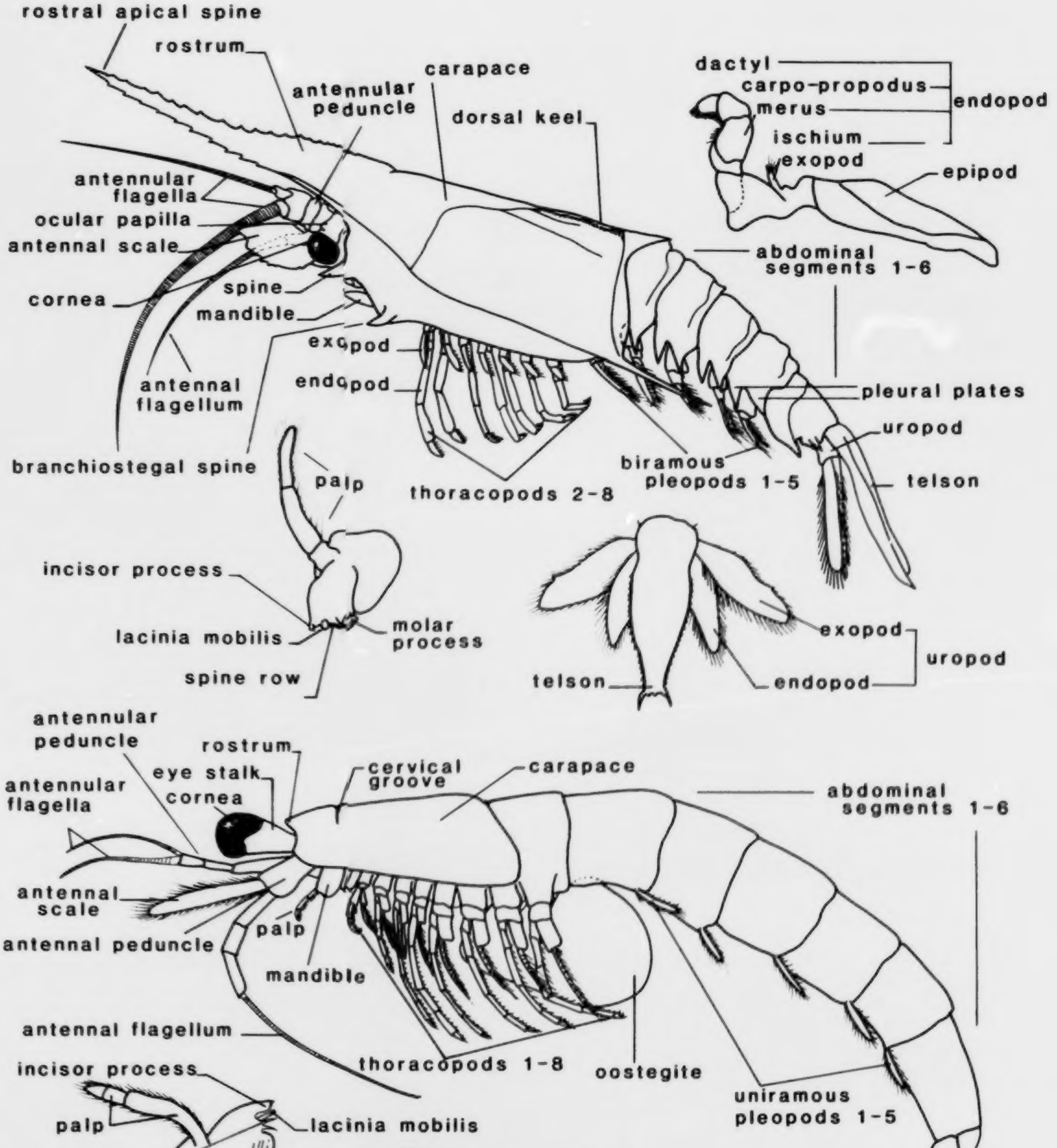
Mating in mysids typically occurs quickly at night between mature males and recently molted females having oocytes in the oviducts. Mating positions vary, in relation to male antennal and pleopod modifications for clasping. The non-motile spermatozoa are either injected directly into the marsupium by the penes, where present, or are transported there indirectly by water currents or male pleopods. In the species investigated, eggs are fertilized as they enter the marsupium. The number of embryos held in the marsupium (1-350) and the duration of development (4 days to one year) varies both among species and within species correlated with factors such as size, season and temperature.

Larval development occurs entirely within the marsupium, and can be divided into three stages. During Stage I (also referred to as "eggs" by some authors) the embryo grows from a sphere to an elipse in side view with rudiments of the antennules, antennae and abdomen. Release from the egg membrane terminates this stage. In Stage II (also called the eyeless larval stage) the abdomen is extended to give the larva a teardrop form. The antennules, antennae and thoracopods develop, and the typically sessile eyes become pigmented. A molt terminates this stage. In Stage III (the eyed larval stage) the eyes become stalked and the appendages, somites and carapace become better defined. The larva leaves the marsupium and another molt terminates this stage.

Larvae released from the marsupium have the general appearance of miniature adults. The greatest differences in juvenile body form occur in the Lophogastrida, including local species of Gnathophausia, where carapace spines are greatly elongated relative to those in adults. In many other species the differences, while less marked, are sufficient to cause misidentification. These differences include relative proportions of the rostrum, antennal scale and appendage segments, as well as the numbers and shapes of spines on various structures.

Juveniles lack one or more secondary sexual characteristics, including a marsupium in females. However, some adult females of Arctic species develop a reduced marsupium following release of the young and subsequent molting. Therefore an assessment of maturity should not be based only on a fully developed marsupium for some species. Most mysids produce several generations during a lifetime of one or two years. Gnathophausia ingens is an exception with a life span estimated at eight years, during which period it appears to produce only one brood (Childress and Price, 1978).

Post-marsupial growth is associated with a series of molts, the number of instars ranging from 10 to 21 in those species which have been investigated. The size and age of maturity has been shown to vary within single species both between and within populations at different periods of the year. The size classes of mature individuals of several populations considered in this handbook differ from those in other latitudes and in other seas. Opinions differ on whether these are ecologically or genetically determined, and if the latter, whether they are of varietal or specific status.


rostral apical spine
rostrum
antennular peduncle
carapace
dorsal keel
antennular flagella
ocular papilla
antennal scale
cornea
spine
mandible
exopod
endopod
antennal flagellum
branchiostegal spine
abdominal segments 1-6
pleural plates
uropod
telson
biramous pleopods 1-5
thoracopods 2-8
dactyl
carpo-propodus
merus
ischium
exopod
endopod
epipod
palp
incisor process
lacinia mobilis
molar process
spine row
exopod
endopod
uropod
telson
antennular peduncle
rostrum
eye stalk
cornea
antennular flagella
cervical groove
carapace
abdominal segments 1-6
antennal scale
antennal peduncle
palp
mandible
antennal flagellum
thoracopods 1-8
oostegite
uniramous pleopods 1-5
incisor process
palp
lacinia mobilis
spine row
molar process
oostegite
protopod
coxa
basis
exopod
preischium
ischium
endopod
merus
carpo-propodus
dactyl
nail
telson
statocyst
endopod
exopod
uropod
uropod
telson

Morphology of generalized mysids

From Comparative Morphology of Recent Crustacea by P.A. McLaughlin.

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SPECIES LIST

Order Mysidacea

Suborder Lophogastrida

Family Lophogastridae

Gnathophausia gigas Willemoes-Suhm, 1875
Gnathophausia ingens (Dohrn, 1870)

Family Eucopiidae

Eucopia australis Dana, 1852
Eucopia grimaldii Nouvel, 1942
Eucopia sculpticauda Faxon, 1873
Eucopia unguiculata (Willemoes-Suhm, 1875)

Suborder Mysida

Family Petalophthalmidae

Ceratomysis spinosa Faxon, 1893
Petalophthalmus armiger Willemoes-Suhm, 1875
[Bacescomysis pacifica Murano and Krygier, 1985]

Family Mysidae

Subfamily Boreomysinae

Boreomysis arctica (Kröyer, 1861)
Boreomysis californica Ortmann, 1894
Boreomysis inermis (Willemoes-Suhm, 1874)
Boreomysis microps G.O. Sars, 1883
[Boreomysis pearcyi Murano and Krygier, 1985]
Boreomysis sp. (rostrata complex)

Subfamily Gastrosaccinae

Archaeomysis grebnitzkii Czerniavsky, 1882

Subfamily Mysinae

Tribe Erythropini

Amblyops abbreviata (G.O. Sars, 1869)
Caesaromysis hispida Ortmann, 1893
[*Dactylerythrops latisquamosa* Murano and Krygier, 1985]
Euchaetomera tenuis G.O. Sars, 1883
Euchaetomeropsis pacifica Banner, 1948
[*Gibbamblyops longisquamosa* Murano and Krygier, 1985]
Holmesiella anomala Ortmann, 1908
Meterythrops robusta S.I. Smith, 1879
[*Paramblyops* species of Murano and Krygier, 1985]
Pseudomma berkeleyi W. Tattersall, 1933
Pseudomma truncatum S.I. Smith, 1879 (of Banner, 1948)
Teraterythrops robusta (Birstein and Tchindonova, 1958)

Tribe Mysini

"*Acanthomysis*" [cf. *Paracanthomysis*] *borealis* (Banner, 1954)
"*Acanthomysis*" [cf. *Paracanthomysis*] *stelleri* (Derzhavin, 1913)
"*Acanthomysis*" [forma *supraoculospinifera*] *columbiae* (W. Tattersall, 1933)
Alienacanthomysis macropsis (W. Tattersall, 1932)
Columbiaemysis ignota Holmquist, 1982
Disacanthomysis dybowskii (Derzhavin, 1913)
Exacanthomysis alaskensis (Banner, 1954)
Exacanthomysis arctopacifica Holmquist, 1981
Exacanthomysis davisi (Banner, 1948)
Holmesimysis costata (Holmes, 1900)
Holmesimysis nuda (Banner, 1948)
Holmesimysis nudensis Holmquist, 1979
Holmesimysis sculpta (W. Tattersall, 1933)
Holmesimysis sculptoides Holmquist, 1979
Inusitatomysis insolita Ii, 1940
Mysis litoralis (Banner, 1948)
Mysis relicta Loven, 1861

Tribe Mysini (cont'd)

Neomysis kadiakensis Ortmann, 1908
Neomysis mercedis Holmes, 1896
Neomysis rayi (Murdoch, 1885)
Pacifacanthomysis nephrophthalma (Banner, 1948)
Proneomysis wailesi W. Tattersall, 1933
Stilomysis grandis (Goes, 1863)
Xenacanthomysis pseudomacropsis (W. Tattersall, 1933)

Tribe Heteromysini

Heteromysis odontops Walker, 1898

Subfamily Mysidellinae

Mysidella americana Banner, 1948

Subfamily Thalassomysinae

[Thalassomysis tattersalli Nouvel, 1942; see Murano and Krygier, 1985]

KEYS TO THE MYSIDACEA

KEY GROUP I (KG I)

KEY TO THE MYSIDS AT THE SUPRAGENERIC LEVEL

(Number following character is page on which character is illustrated)

ANTENNAL SCALE: setae

E : Entire; setae around entire scale 219 c
P : Part; setae only partially around scale 107 b,c
N : No; no setae on scale

ANTENNAL SCALE: spine

Y : Yes; spine (=tooth) lateral to apex 107 b,c
N : No; no spine or tooth lateral to apex 165 a

LABRUM: cleft or entire

C : Cleft 193 c
E : Entire 204 d

LABRUM: anterior end pointed

Y : Yes; anterior end pointed 101 e
N : No; anterior end rounded 193 c

1st THORACOPOD: 6th segment expanded

Y : Yes; 6th segment expanded 193 f
N : No; 6th segment not expanded 199 d

3rd - 8th THORACOPODS: character of joint

Ob : Oblique; oblique joint between carpus and propodus, causing distal segments to be angled 133 f,g
St : Straight; straight joint between carpus and propodus; or carpus and propodus are fused, with secondary joints straight 143 c,d

3rd THORACOPOD: stouter than 4th-8th thoracopods
Y : Yes; stouter than 4th-8th 165 c
N : No; not stouter than 4th-8th 198 e

PROPODUS OR CARPO-PROPODUS DIVISIONS: number of divisions on 3rd-8th thoracopods

Number listed represents number of divisions

M : Many

5th - 7th THORACOPODS: equal to body length

Eq : Equal; 5th to 7th thoracopods equal to body length 143 a

Sh : Shorter; 5th to 7th thoracopods shorter than body length 97 a

GILLS: number of pairs

Number listed represents number of pairs of gills

OOSTEGITES: number

Number listed represents number of developed pairs

PLEURAL PLATES: number present

6 : Present on all six segments of abdomen 159 a

1 : Present on 1 segment of abdomen

0 : Not present on any segments

1, E : Present on 1 segment of abdomen, and expanded laterally in female 101

MALE PLEOPODS: biramous

All : All; pleopods 1 to 5 biramous 105 g

2-5 : Pleopods 2 to 5 biramous

3/3+ : Pleopod 3 alone biramous OR pleopod 3 in conjunction with 1 or more other pleopods biramous

4(+3) : Pleopod 4 biramous; occasionally pleopod 3 also biramous

0 : No biramous pleopods 164 e,f

FEMALE PLEOPODS: biramous

Y : Yes; all pleopods biramous 159 e

N : No pleopods biramous 106 g

V : Variable; 0-5 pairs of biramous pleopods

STATOCYST: present

Y : Yes; statocyst present 153 g
N : No; statocyst absent 141 e

EXOPOD OF UROPOD: distal suture

Y : Yes; distal suture on exopod 141 e
N : No; no distal suture on exopod 165 g
P : Partial; partial or rudimentary distal suture on exopod (difficult to detect) 105 h

EXOPOD OF UROPOD: spines or setae

Sp : Spines; proximal outer margin of exopod with spines 105 h
Se : Setae; proximal outer margin of exopod with setae 165 g
O : None; proximal outer margin of exopod with no spines or setae 141 e

ENDOPOD OF UROPOD: distal suture

Y : Yes; with distal suture on endopod
N : No; without distal suture on endopod 165 g

TELSON: shape of apex

C : Cleft 165 g
E : Entire 141 e,f

TELSON APEX: plumose setae

Y : Yes; pair of plumose setae on apex of telson 133 h,i
N : No; no plumose setae on apex of telson 121 d

DISTRIBUTION: depth

D : Deep; restricted to deep waters (>200m)
V : Variable; can occur in shallow and/or deep waters

RECORDED SPECIES: number

Number listed represents recorded species in temperate NE Pacific

ANT. SCALE: setae	ANT. SCALE: spine	LABR.: cleft, ent.	LABR.: ant. pointed	THOR. 1: 6th exp.	THOR. 3-8: joint	THOR. 3: >thor. 4-8	PROPODUS: divisions	THOR. 5-7 = body len.	GILLS: number	OOSTEGITES: number	PLEURAL PLATES: no.	MALE PLEOPODS: bir.	FEMALE PLEOPODS: bir.	STATOCYST: present	UROPOD EXOPOD: sut.	URO. EXO.: spine, set.	UROPOD ENOPOD: sut.	TELSON: shape	TELSON: plumose set.	DISTRIBUTION: depth	SPECIES: number	
P	Y/N	E	Y	N	St	N	0	Sh	2-7(8)	7	6	All	Y	N	Y/N	Sp	N	C/E	Y/N	D	2	Lophogastridae[a] KG 2 39 (Gnathophausia)
P	Y/N	E	Y	N	St	N	0	Eq	2-7	7	0	All	Y	N	Y	Sp/O	N	E	Y/N	D	2	Eucopiidae[a] KG 2 39 (Eucopia)
E	Y/N	E	N	N	St	N	0	Sh	0	7	0	All	N	N	Y/N	Sp/Se	N	E	N	D	2	Petalophthalmidae[a] KG 2 39
P	Y	E	Y	N	St	N	0	Sh	0	7	0	All	N	Y	P	Sp	N	C	N	D	6	Boreomysinae[b] KG 2 39
P	Y	E	N	N	St	N	0	Sh	0	3	0/1	All	N	Y	Y	Se	Y	E	N	V	0	Rhopalophthalminae[b]
P	Y	E	Y	N	St	N	0(2)	Sh	0	3	0	All	N	Y	Y	Sp	N	E	Y	V	0	Siriellinae[b]
P	Y	E	Y	N	St	N	2-13	Sh	0	2	1,E	3/3+	V[3]	Y	N	Sp	N	C	N	V	1	Gastrosaccinae[b] KG 2 39 (Archaeomysis grebnitzkii)
E/P	N	C	Y/N	Y	St	N	2-3	Sh	0	3	0	0	N	Y	N	Se	N	C	N	V	1	Mysidellinae[b] KG 2 39 (Mysidella americana)
P	Y	E	N(Y)	N	Ob	N	0(1)	Sh	0	2-3	0	All/ 2-5	N	Y	N	Se	N	E	Y/N	V	14	Erythropini[c] KG 3 53
E	N	E	N(Y)	N	St	N	2-3(+)	Sh	0	2-3	0	All	N	Y	N	Se	N	C/E	Y/N	V	0	Leptomysini[c]
E/P	Y/N	E	Y/N	N	St[1]	N	2-M	Sh	0	2-3	0	4(+3)[2]	N	Y	N	Se	N	C/E	Y/N	V	24	Mysini[c] KG 4 59
E	N	E	N	N	St	Y	3-7	Sh	0	2-3	0	0	N	Y	N	Se	N	C	N	V	1	Heteromysini[c] KG 2 39 (Heteromysis odontops)

/ = OR; could be either choice; e.g., Y/N = yes or no
( ) = uncommon or rare; e.g., 0(2) = none, occasionally 2
+ = more; e.g., 2+ = 2 or more

[a] family; [b] subfamily; [c] tribe (see species list)

[1] distal subjoint oblique in Inusitatomysis
[2] except Inusitatomysis (Mysini)
[3] all biramous in Archaeomysis

KEY GROUP 2 (KG 2)

KEY TO GENERA IN TRIBES OTHER THAN MYSINI AND ERYTHROPINI

CARAPACE: description
Sp : Spiny
Sm : Smooth

ROSTRUM: length
L : Long; rostrum greater than antennal scale
S : Short; rostrum shorter than antennal scale
O : None; no rostrum present

ROSTRUM: shape
P : Pointed
R : Rounded
O : No rostrum

EYES: blind
Y : Yes; blind, no retina
N : No; one retina

EYES: shape
R : Rounded or spherical
Sp : Spineline
L : Leaflike

MANDIBULAR PALP: length
P : Prehensile; longer than carapace
S : Short; shorter than carapace

ABDOMINAL SEGMENTS: description
Sp : Spiny
Sm : Smooth

MALE PLEOPODS: all biramous

Y	:	Yes; all pleopods biramous
N	:	No, none biramous

TELSON: shape of apex

Cr	:	Crescent-shaped
C	:	Cleft
E	:	Entire

TELSON: lateral spines present

Y	:	Yes
N	:	No

SMALL & LARGE SPINES: number of apical pairs on telson

Numbers listed represent number of pairs of small spines and large spines. E.g., 9+&0 is 9 or more small spines and no large spines; 5&4 is 5 small spines and 4 large spines

TELSON APEX: plumose setae

Y	:	Yes; pair of plumose setae on apex of telson
N	:	No; no plumose setae on apex of telson

DISTRIBUTION: depth

Number listed represents depth in meters

RECORDED SPECIES: number

Number listed represents recorded species in temperate NE Pacific

CARAPACE: descrip.	ROSTRUM: length	ROSTRUM: shape	EYES: blind	EYES: shape	MAND. PALP: length	ABD. SEG.: descrip.	MALE PLEO.: bir.	TELSON: shape	TELSON: lat. spines	SM & LG SPINES: prs.	TELSON: plumose set.	DISTRIBUTION: depth	SPECIES: number	
Sp	L	P	N	R	S	Sm	Y	Cr	Y	9+&0	N	> 200	2	Gnathophausia KG 21 43
Sm	S	R	N	R	S	Sm	Y	E	Y	0&1	Y/N	> 600	2	Eucopia KG 22 45
Sp	0	0	Y	Sp	S	Sp	Y	E	Y	0&1	N	> 1000	1	Ceratomysis (spinosa) 119
Sm	S	P	Y	L	P	Sm	Y	E	Y	5&5	Y	> 900	1	Petalophthalmus (armiger) 213
Sm	S	P/R	N	R	S	Sm	Y	C	Y	2+&1	N	> 200	6	Boreomysis KG 23 49
Sm	S	R	N	R	S	Sm	Y	C	Y	2+&0	N	> 200	1	Archaeomysis (grebnitzkii) 99
Sm	S	R	N	R	S	Sm	N	C	Y	1+&0	N	> 200	1	Heteromysis (odontops) 163
Sm	O/Sh	O/R	N(Y)	R	S	Sm	N	C	Y	1+&0	N	> 50	1	Mysidella (americana) 191

/ = OR; could be either choice; e.g., Y/N = yes or no
( ) = uncommon or rare; e.g., N(Y) = usually no, rarely yes

KEY GROUP 21 (KG 21)

KEY TO SPECIES OF *Gnathophausia*

CARAPACE: supraorbital spine

Y : Yes; a large supraorbital spine present
N : No; either a small supraorbital spine present, or no spine

ROSTRUM: serrated

Y : Yes; rostrum with strong obvious serrations
N : No; rostrum smooth or with weak serrations

ANTENNAL SCALE: shape

L : Lanceolate; scale narrow and tapering at either end
O : Ovate; scale oval, broad at base and tapering at distal end

ANTENNAL SCALE: spines

L : Large; spines on scale large and distinct
S : Small; spines on scale small

ABDOMEN: epimera on 2nd-5th segments, anterior member

R : Rounded; the anterior member of each pair of epimera on the 2nd-5th segments is rounded
P : Pointed; the anterior member of each pair of epimera on the 2nd-5th segments is pointed

SIZE: mm

Number listed represents approximate maximum size of adults in mm, including the rostrum

CARAPACE: spine	ROSTRUM: serrated	ANT. SCALE: shape	ANT. SCALE: spines	ABDOMEN: ant. epimera	SIZE: mm		
Y	Y	L	L	R	164	*G. gigas*	158
N	N	O	S	P	350	*G. ingens*	160

KEY GROUP 22 (KG 22)

KEY TO SPECIES OF *Eucopia*

CARAPACE: anterior margin shape

Wc : Weakly convex; anterior margin of carapace weakly convex
Sc : Strongly convex
An : Angular

ANTENNULAR PEDUNCLE: 3rd segment margin

S : Straight; inner margin of 3rd segment straight or slightly convex
C : Concave; inner margin of 3rd segment concave

ANTENNULAR PEDUNCLE: 3rd segment lobe

Eq : Equal; distal margin of the inner lobe is as long as the outer lobe
2X : 2 times; distal margin of the inner lobe is 2 times as long as the outer lobe

ANTENNULAR PEDUNCLE: 3rd segment apex symmetrical

Y : Yes; distal margin of 3rd segment is symmetrical
N : No; distal margin of 3rd segment is not symmetrical

ANTENNAL SCALE: margin

Si : Sinuous; outer margin of scale curving
St : Straight; outer margin of scale straight

ANTENNAL SCALE: spine

Y : Yes; spine present, adjacent to suture
N : No; no spine adjacent to suture

GILLS: 8th pair

Y : Yes; with pair of gills on 8th thoracic segment
N : No; no gills on 8th thoracic segment

TELSON: ratio of 6th abdominal segment to telson

S : Shorter; 6th abdominal segment shorter than telson

E : Equal; 6th abdominal segment subequal to telson

L : Longer; 6th abdominal segment 1.5X as long as telson

TELSON: 1-2 constrictions near apex

Y : Yes; 1-2 constrictions distally

N : No; no constrictions distally

TELSON: honeycomb ridges dorsally

Y : Yes; honeycomb ridges or latticework dorsally

N : No; no honeycomb structures dorsally

TELSON APEX: shape

T : Truncate; end of telson square

R : Round; end of telson rounded

TELSON APEX: pair of large spines

Y : Yes; 1 pair of large apical spines

N : No; no large apical spines

TELSON APEX: number of small spines

Number listed represents the number of small spines on each side between the large penultimate and apical spines.

TELSON APEX: pair of apical setae

Y : Yes; 1 pair of setae on telson apex

N : No; no setae on telson apex

SIZE: mm

Number listed represents size range of adults in mm

	E. australis 140	E. grimaldii 144	E. sculpticauda 142	E. unguiculata 145
CARAPACE: ant. mar. shape	Sc	Wc	An	Wc
ANT. PED.: 3rd seg. mar.	C	S	S	S
ANT. PED.: 3rd seg. lobe	Eq	2X	2X	Eq
ANT. PED.: 3rd seg. apex sym.	N	N	N	Y
ANT. SCALE: margin	Si St	Si	St	St
ANT. SCALE: spine	Y	Y	N	Y
GILLS: 8th pair	N	N	Y	N
TELSON: abd. seg. 6 ratio	S	E	S	L
TELSON: 1-2 constrictions	N	N	Y	N
TELSON: honeycomb ridges	N	N	Y	N
TELSON APEX: shape	R	R	R	T
TELSON APEX: pr. lg. spines	Y	Y	N	Y
TELSON APEX: no. sm. spines	9-18	2-4(8)	n/a	8-25
TELSON APEX: pair setae	Y	Y	N	Y
SIZE: mm	45-70	29-40	30-66	29-40

KEY GROUP 23 (KG 23)

KEY TO SPECIES OF *Boreomysis*

ROSTRUM: apex angle

A : Acute; angle of apex of rostrum is _90°
R : Right; angle of apex of rostrum is 90°
O : Obtuse; angle of apex of rostrum is _90°

ANTENNAL SCALE: length to width ratio

Number listed represents length to width ratio of scale

CORNEA: size

L : Less; diameter of eye cornea is less than eyestalk width
E : Equal; diameter of cornea is equal to stalk width
G : Greater; diameter of cornea is greater than stalk width
B : Blind; there is no cornea

2ND THORACOPOD: subchelate

Y : Yes; distal end of endopod of 2nd thoracopod forms chelate structure
N : No; no chelate structure

UROPOD: spines

Number listed represents number of spines on outer margin between armed and unarmed section

STATOCYST: spines

Number listed represents number of spines on lower, inner margin adjacent to statocyst

TELSON: sides concave or convex

Cc : Concave; sides of distal half of telson concave

Cv : Convex; sides of distal half of telson straight or convex

TELSON CLEFT: dilated

Y : Yes; cleft of telson dilated proximally

N : No; cleft not dilated

SIZE: mm

Number listed represents approximate maximum size of adults in mm

ROSTRUM: apex angle	ANT. SCALE: l-w ratio	CORNEA: size	2nd THOR.: subchelate	UROPOD: spines	STATOCYST: spines	TELSON: concave, convex	TELSON CLEFT: dil.	SIZE: mm	
A	5	G	N	2	2	Cc	N	27	*B. arctica* 104
A	3	L/E	N	1	1	Cc	N	24	*B. californica* 106
R	4.5	B	Y	0-2	2	Cv	N	60	*B. inermis* 108
O	4	L	Y	1	1	Cc	Y	28	*B. microps* 110
O	4	G	N	2	1	Cc	Y	28	*B. rostrata complex* 112

KEY GROUP 3 (KG 3)

KEY TO GENERA IN TRIBE ERYTHROPINI

CARAPACE: description

Sp : Spiny
Sm : Smooth

ROSTRUM: shape of apex

P : Pointed
R : Rounded
N : No rostrum

ANTENNA: number of segments in peduncle

Number listed represents number of segments

ANTENNAL SCALE: spine on outer distal margin

Y : Yes; spine on scale
N : No; no spine on scale

EYES: separate or fused

S : Separate
F : Fused

EYES: stalked or sessile (immobile)

St : Stalked
Ss : Sessile

EYES: number of pigmented retinas per eye

O : No pigmented retinas
S : Small; one small imperfectly developed retina
1 : One well developed retina
2 : Two well developed retinas, may be equal or unequal in size

ABDOMINAL SEGMENTS: description
Sp : Spiny
Sm : Smooth

4th MALE PLEOPOD: much longer than other pleopods
Y : Yes
N : No

TELSON: number of lateral spines
O : No; no lateral spines
F : Few; a few lateral spines
S : Some; some spines but number is not certain
M : Many; many spines

SMALL & LARGE SPINES: number of apical pairs on telson
M : Many; many pairs of similar sized spines
1&1 : Number of pairs of small spines & large spines
2L : 2 large spines
1 : A single number [e.g., 1; 1+; 2(1)] denotes the total number of pairs of spines of variable sizes

TELSON APEX: plumose setae
Y : Yes; pair of plumose setae on apex of telson (rarely a single seta)
N : No; no plumose setae on apex of telson

DISTRIBUTION: depth
Number listed indicates depth in meters

RECORDED SPECIES: number
Number listed represents recorded species in temperate NE Pacific

CARAPACE: descr.	ROSTRUM: shape	ANT.: ped. seg.	ANT. SCALE: spine	EYES: sep., fused	EYES: stalk., sess.	EYES: no. retinas	ABD. SEG.: descr.	4th ♂ PLEO.: long.	TELSON: lat. spines	SM & LG SPINES: prs.	TELSON: plumose set.	DISTRIBUTION: depth	SPECIES: number	
Sm	N	4	Y	S	Se	0	Sm	N	M	1+	Y	>200	1	Amblyops (abbreviata) 95
Sp	P	3	N	S	St	2	Sp	N	F	1	Y	>100	1	Caesaromysis (hispida) 115
Sm	P/R	3	Y	S	St	2	Sm	N	0(S)	2(1)	Y	>100	1	Euchaetomera (tenuis) 131
Sm	P/R	3	N	S	St	2	Sm	N	0	1	Y	>60	1	Euchaetomeropsis (pacifica) 135
Sm	R	3	Y	S	St	1	Sm	Y	M	1&1	Y	>75	1	Holmesiella (anomala) 167
Sm	R	3	Y	S	St	1	Sm	N	0	2L	Y	>65	1	Meterythrops (robusta) 187
Sm	N	3	Y	F	Se	0	Sm	N	0/S	1+	Y/N	>50	2	Pseudomma KG 31 57
Sm	N	3	Y	S	St	S	Sm	N	0(F)	0&1	Y	>500	1	Teraterythrops (robusta) 231

/ = OR; could be either choice; e.g., P/R = pointed or rounded
( ) = uncommon or rare; e.g., 2(1) = usually 2, rarely 1
+ = more; e.g., 1+ = 1 or more

KEY GROUP 31 (KG 31)

KEY TO SPECIES OF *Pseudomma*

ANTENNAL SCALE: apex length

S : Subequal; apex length is subequal to outer margin spine length

L : Longer; apex is much longer than spine, extending 1/3 of scale length beyond spine

EYE: teeth

9C : 9 Coarse; 9 coarse teeth along anterior margin of ocular plate

O : None; ocular plate smooth or possibly with very fine serrations appearing smooth

TELSON APEX: shape

R : Rounded; apex rounded

T : Truncate; apex truncate or square

TELSON APEX: prs. spines

Number listed represents number of pairs of subequal apical spines

TELSON: lateral spines

Number listed represents number of lateral spines on each side of telson

SIZE: mm

Number listed represents approximate maximum adult size in mm

ANT. SCALE: apex length	EYE: teeth	TELSON APEX: shape	TELSON APEX: prs. spines	TELSON: lat. spines	SIZE: mm		
S	9C	R	3	4-5	8	P. berkeleyi	221
L	O*	T	2	4-8	15	P. truncatum	224

*Atlantic specimens have 9 or more fine teeth on ocular plate, but NE Pacific specimens generally have no teeth or very fine serrations.

KEY GROUP 4 (KG 4)

KEY TO GENERA IN TRIBE MYSINI (per Holmquist)

CARAPACE: shape of antero-lateral corners

R : Rounded
P : Pointed
A : Angular

CARAPACE: supraocular spine or process present

Y : Yes; supraocular spine present
N : No; spine absent

ROSTRUM: angle of the apex

A : Acute
R : Right
O : Obtuse
V : Variable among species

ROSTRUM: shape of apex

R : Rounded
P : Pointed
V : Variable among species

MALE ANTENNULE: process on inner flagellum

Y : Yes
N : No

ANTENNAL SCALE: setae

Y : Yes; setae around entire scale
P : Part; setae only partially around scale

ANTENNAL SCALE: shape of apex

R : Rounded
P : Pointed

LABRUM: shape of frontal process

P : Pointed; pointed or acute
R : Rounded

3rd - 8th THORACOPODS: number of carpo-propodus segments

F : Few
M : Many
(No.) : Actual number of segments

OOSTEGITES: number of regular pairs

Number listed represents number of regular pairs present

ABDOMEN: description of dorsal surface of segments

Sm : Smooth
Pr : Process; with small processes or spines
Gr : Grooves; with grooves or folds

ABDOMEN: pointed process or spine dorsally at posterior margin of 6th segment

Y : Yes
N : No

MALE PLEOPODS: number of pleopod(s) which is (are) biramous

Number listed represents which pleopod(s) is (are) biramous

4th MALE PLEOPOD: ratio of endopod:exopod

2 : Ratio is 1:2
3 : Ratio is 1:3
4 : Ratio is 1:4
5 : Ratio is 1:5

Note: < = less than; > = greater than; ≥ = greater than or equal to

4th MALE PLEOPOD: number of exopod segments

Number listed represents number of segments

5th MALE PLEOPOD: Length equal to or longer than 4th male pleopod (in adults)

Y : Yes; equal to or longer than 4th

N : No; shorter than 4th

STATOCYST: number of spines on lower inner margin

F : Few; less than 10 spines on lower inner margin of the statocyst

M : Many, more than 10 spines

(No.) : Actual number of spines

TELSON: base of telson greatly dilated or approximately straight

D : Dilated

S : Straight

TELSON: shape of apex

R : Rounded

T : Truncated; straight across tip of telson

C : Cleft

TELSON SPINATION: spines on entire margin or only on distal part

E : Entire margin

P : Part; spines around distal portion of telson

TELSON SPINATION: number of lateral spine size classes

1 : One size class of spines; all spines approximately same size

2 : Two size classes of spines; divided into distinct groups of large and small spines

SMALL & LARGE SPINES: number of apical pairs on telson

(No.)&(No.) : Number of pairs of small spines & large spines

MS : Many small spines at apex

V : Variable number of spines among species

RECORDED SPECIES: number

Number listed represents number of recorded species in temperate NE Pacific

CARAPACE: corners	CARAPACE: s-o spine	ROSTRUM: apex angle	ROSTRUM: apex shape	MALE ANT.: proc.	ANT. SCALE: setae	ANT. SCALE: apex	LABRUM: fr. proc.	THOR. 3-8: c-p seg.	OOSTEGITES: reg. prs.	ABDOMEN: seg. surf.	ABDOMEN: 6th seg.	MALE PLEO.: bir.	4th ♂ PLEO.: en:ex	4th ♂ PLEO.: ex. seg.	5th ♂ PLEO.: long	STATOCYST: spines	TELSON: dil., str.	TELSON: apex shape	TEL.: sp. ent., part	TEL.: size classes	SM & LG SPINES: prs.	SPECIES: number	
R	N	O	P	N	Y	R	P	F	2	Sm/Gr	N	4	<2	2	N	F	D	R	P	2	V	0	Acanthomysis (restricted)[1]
R	N	V	P	N	Y	R	P	F	2	Sm	N	4	<4	2	N	6-9	S	R	E	2	1&1	1	Pacifacanthomysis (nephrophthalma) 209
P	N	O	R	N	Y	R	R	5-7	2	Sm	N	4	3	2	N	1	S	R	E	2	MS	1	Alienacanthomysis (macropsis) 91
P	N	O	P	N	Y	R	P	F	2	Sm	N	4	>2	2	Y	12+	S	R	E	2	1&1	1	Disacanthomysis (dybowskii) 127
R/A	N	A	P	N	Y	R	P	4-8	2	Gr	N	4	≥2	2	N	F	S	T	E	2	1&1	3	Exacanthomysis KG 41 65
R	N	V	P	N	Y	R	P	5-9	2	Sm/Pr	Y	4	<2	1/2	N	3-8	S	T	E	2	1&2	5	Holmesimysis KG 42 67
P	Y	O	R	N	Y	R	P	7	2	Sm/Gr	N	4	*	2	N	0	S	R	E	1	MS	1	"Acanthomysis" (columbiae) 81
P	N	A	P	*	Y	R	P	4-7	*	Gr	N	*	*	*	N	4-5	S	R	E	2	1&1	2	cf. Paracanthomysis KG 43 71
P	N	O	R	Y	Y	R	P	7	2	Sm.Gr	N	4	<4	1-3?	N	0/1	S	R	E	2	MS	1	Xenacanthomysis (pseudomacropsis) 235
A	N	A	P	N	Y	R	P	5-6	2	Sm	N	4	4	*	N	4	S	R	E	1	1&1	1	Columbiaemysis (ignota) 123
R	N	R	R	N	Y	R	*	2-3	3	Sm	N	3,4	<4	4-5	N	M	S	T	E	1/2	1&1	1	Stilomysis (grandis) 227
R	N	R	R	N	Y	R/P	R	F	2	Sm	N	3-5	5	6-7	N	F	S	C	E	1	0&1	2	Mysis KG 44 73
R/P	N	V	V	N	Y	P	P	M	2	Sm	N	4	2	2	N	M	S	T	E	1	1&1	3	Neomysis KG 45 77
A	N	A	P	N	Y	R/P	P	5	2	Sm	N	4	<4	3	Y	F	S	R	P	2	1&1	1	Proneomysis (wailesi) 217
P	Y	A	R	N	P	R	R	3	3	Sm	N	0	0	0	N	1	S	C	E	1	2&1	1	Inusitatomysis (insolita) 183

/ = OR; could be either choice; e.g., 1/2 = 1 or 2

* No data available or no male specimens

[1] Not considered further; see Holmquist, 1981b for diagnosis

KEY GROUP 41 (KG 41)

KEY TO SPECIES OF *Exacanthomysis*

CARAPACE: shape of anterolateral corners

R : Round; anterolateral corners rounded
P : Pointed; anterolateral corners acutely pointed

3rd - 8th THORACOPODS: number of carpo-propodus segments

Number listed represents number of segments

STATOCYST: number of spines on lower inner margin

Number listed represents number of spines

TELSON: size increase of large lateral spines distally

Y : Yes; large lateral spines become larger from proximal to distal end
N : No; there is no size change in large lateral spines distally

TELSON: distal portion linguiform and lacking large spines

Y : Yes; distal part of telson tonguelike, with no large lateral spines
N : No; distal portion not tonguelike, although may narrow, and has large lateral spines

TELSON: number of small lateral distal spines between large spines

Number listed represents number of small spines between each pair of distal large spines

SIZE: mm

Number listed represents approximate size of adults in mm

CARAPACE: corners	THOR. 3-8: c-p seg.	STATOCYST: spines	TELSON: spines inc. size	TELSON: tongue	TELSON: small spines	SIZE: mm	
P	6-8	4-5	N	N	3-5	10-20	E. alaskensis 150
R	4-5(6)	6-8	Y	N/Y	6-13	10-15	E. arctopacifica 152
R	4-5	4-5	Y	Y	3-4	7-12	E. davisi 154

KEY GROUP 42 (KG 42)

KEY TO SPECIES OF *Holmesimysis*

ENDOPOD OF THORACOPODS: setae

D : Dense; covered with many setae
S : Sparse; covered with few setae

ABDOMEN: number of transverse folds on segment 1
ABDOMEN: number of transverse folds on segment 2
ABDOMEN: number of transverse folds on segment 3
ABDOMEN: number of transverse folds on segment 4
ABDOMEN: number of transverse folds on segment 5

Number listed represents number of folds on each segment

ABDOMEN: posterior fold as two curving side-by-side folds on segment 6

Y : Yes; the posterior fold on segment 6 resembles two curving, side-by-side folds, laterally passing over to the narrow longitudinal grooves of the posterior margin
N : No; no posterior curving folds on segment 6 (although a single fold can be present, it does not curve)

ABDOMEN: presence of posterior processes on segment 3 dorsally
ABDOMEN: presence of posterior processes on segment 4 dorsally
ABDOMEN: presence of posterior processes on segment 5 laterally
ABDOMEN: presence of posterior processes on segment 5 dorsally

Y : Yes; processes are present
N : No; no processes present

TELSON: the posterior-most large lateral spines reach tip of apex

E : Equal; the posterior-most large lateral spines reach to approximately the tip of telson apex
L : Long; the posterior-most large lateral spines reach well beyond the tip of telson apex
S : Short; the posterior-most large lateral spines are shorter than the tip of telson apex

Note: Ss means slightly shorter than apex tip
Sm means much shorter than apex tip

TELSON: number of large lateral spines

12 : Approximately 12 large lateral spines, but can vary slightly

18 : Approximately 18 large lateral spines, but can vary slightly

Note: *H. nudensis* can have up to 24

ENDOPOD OF UROPOD: number of spines on inner lower margin of statocyst

Number listed represents number of spines adjacent to the inner lower margin of the statocyst

THOR. END.: setae	ABD.: folds, seg. 1	ABD.: folds, seg. 2	ABD.: folds, seg. 3	ABD.: folds, seg. 4	ABD.: folds, seg. 5	ABD.: post. fold = 2	ABD.: proc., seg. 3d	ABD.: proc., seg. 4d	ABD.: proc., seg. 51	ABD.: proc., seg. 5d	TELSON: spine length	TELSON: no. lg. spines	URO. END.: no spines	
S	2(3)	2(3)	2(3)	2	2	Y	N	N	N	N	E/Ss	12-18	3(4)	H. costata 172
S	0	0	0(1/2)	0/1(2)	0/1	N	N	N	N	N	S	18-20	3-4	H. nuda 174
D	0	0	0	0(1)	0(1)	N	N	N	Y(N)	Y	L	18-23	4-8	H. nudensis 176
D	3	2	2	2	2	Y	Y/N	Y	Y	Y	Sm(E)	16-18	6-7	H. sculpta 178
S	2/3	2	2	2	2	Y	N	N	Y	Y	L	18-20	3-5	H. sculptoides 180

KEY GROUP 43 (KG 43)

KEY TO SPECIES OF *"Acanthomysis"* cf. *Paracanthomysis*

3rd - 8th THORACOPODS: number of carpo-propodus segments

Number listed represents number of segments on endopod of 3rd-8th thoracopods

STATOCYST: number of spines on lower inner margin

Number listed represents number of spines on lower inner margin

TELSON: number of small lateral distal spines between large spines

Number listed represents number of small spines between each pair of large distal spines

THOR. 3-8: c-p seg.	STATOCYST: no. spines	TELSON: small spines		
5-7	4	2-6	"A". cf. P. borealis	86
4-6	5	8-10	"A". cf. P. stelleri	88

KEY GROUP 44 (KG 44)

KEY TO SPECIES OF *Mysis*

ANTENNAL SCALE: length to width ratio

Number listed represents length to width ratio of scale

3rd - 8th THORACOPODS: carpo-propodus segments

Numbers listed represents number of segments

4th MALE PLEOPOD: length

Ab : Abdominal segments; 4th male pleopod reaches to approximately the end of the abdominal segments
Te : Telson; 4th male pleopod reaches to posterior of the telson

UROPOD: endopod spines

Number listed represents number of spines on the lower inner margin of the endopod

TELSON CLEFT: sides

St : Straight; inside margins of cleft are straight from the telson apex to the inside cleft apex
Bb : Bulbous; inside margins flex out and are curved from the telson apex to the inside cleft apex

TELSON CLEFT: angle

A : Acute; angle at cleft apex where 2 cleft margins meet is $<90^\circ$
R/O : Right or Obtuse; angle at cleft apex where 2 cleft margins meet is $\geq 90^\circ$

HABITAT: NE Pacific

M : Marine; restricted to marine waters
F : Freshwater; typically freshwater, but may occur in estuarine habitats

SIZE: mm

Number listed represents the size range of adults in mm

ANT. SCALE: l-w ratio	THOR. 3-8: c-p segs.	4th MALE PLEO.: length	UROPOD: endopod spines	TELSON CLEFT: sides	TELSON CLEFT: angle	HABITAT: NE Pacific	SIZE: mm	
5-5.5	5	Ab	4-8	Bb	A	M	12-29	*M. litoralis* 196
4	6-7	Te	4	St	R/O	F	15-18	*M. relicta* 198

KEY GROUP 45 (KG 45)

KEY TO SPECIES OF *Neomysis*

ANTENNAL SCALE: length to width ratio

Number listed represents length to width ratio of scale

3rd - 8th THORACOPODS: carpo-propodus segments

Number listed represents number of segments

TELSON: length to width ratio

Number listed represents length to width ratio

TELSON: number of lateral spines

Number listed represents number of lateral spines on each margin of the telson

TELSON: spacing of lateral spines

C : Close; spines closely spaced along lateral margins of telson

W : Wide; spines widely spaced along lateral margins of telson

HABITAT: NE Pacific

M : Marine; restricted to marine waters

F : Freshwater; generally found in freshwater, but may occur in estuarine habitats

SIZE: mm

Number listed represents the size range of adults in mm

ANT. SCALE: l-w ratio	THOR. 3-8: c-p segs.	TELSON: l-w ratio	TELSON: no. lat. spines	TELSON: spac. lat. spines	HABITAT: NE Pacific	SIZE: mm	
12-14	8-12	2.5	29-35	C	M	20-23	N. kadiakensis 202
8-9	5-8(1st-5th) 8-10(6th)	1.8	12-15	W	M/F	11-15	N. mercedis 204
10-12	8-10*	2.5	20-25	W	M	18-65	N. rayi 206

*Large specimens may have up to 22 segments.

DIAGNOSES AND ILLUSTRATIONS OF THE MYSIDACEA

"Acanthomysis" forma supraoculospinifera

SYNONYMY AND REFERENCES

Neomysis (in part)
W. Tattersall, 1933 (1)

Acanthomysis (in part)
Banner, 1948b (2)
W. Tattersall, 1951 (3)

"Acanthomysis" by Holmquist, 1981b (4)

"Acanthomysis" forma supraoculospinifera herein

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Supraocular spine on each side, anterolateral margins pointed. Rostrum with convex sides, forming an obtuse angle at rounded apex.

Eyes. Normally developed with single approximately hemispherical cornea; overall length <1½X mid-stalk width, much shorter than antennal scale; stalk with dorsal papilla.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed apex.

Thoracopods. 3rd-8th carpo-propodus of endopod several segmented.

Oostegites. 2 pairs.

Abdomen. Smooth, no folds or spines.

Pleopods. All rudimentary in females, and all but 4th rudimentary in males, only unjointed plates. Male 4th with 2 terminal barbed setae, length about equal to adjacent segment.

Uropods. No spines on lower inner margin of endopod adjacent to statocyst.

Telson. Linguiform, length 2½X width, rounded apex. Lateral spines full length of margins with only slight difference in size among them. Smaller spines around apex, but juveniles from British Columbia (4) have larger spines at apex except for single pair of small medial ones.

TAXONOMIC NOTES Only 1 species known at present although (4) hints that differences between California and British Columbia populations might warrant species status. Holmquist (4) considered this species sufficiently different to be excluded from her definition of the genus Acanthomysis. The supraocular spines and very thin antennal scale are not known for any other member of the genus, even broadly defined. No generic assignment has been made. A form name is employed here as an interim measure until a genus is designated.

"Acanthomysis" forma supraoculospinifera columbiae (W. Tattersall, 1933)

SYNONYMY AND REFERENCES

Neomysis columbiae W. Tattersall, 1933 (1)

Acanthomysis columbiae by Ii, 1936
Banner, 1948b (2)
W Tattersall, 1951 (3)

"Acanthomysis" columbiae by Holmquist, 1981b (4)
Holmquist, 1982 (5)

CHARACTERIZATION (1, 2, 3, 4)

Antennal scale. Length 12-15 times width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 7 segmented.

Telson. Apex with about 30 small spines between pair of large spines; each lateral margin with about 42 larger spines.

Size. 14-20 mm.

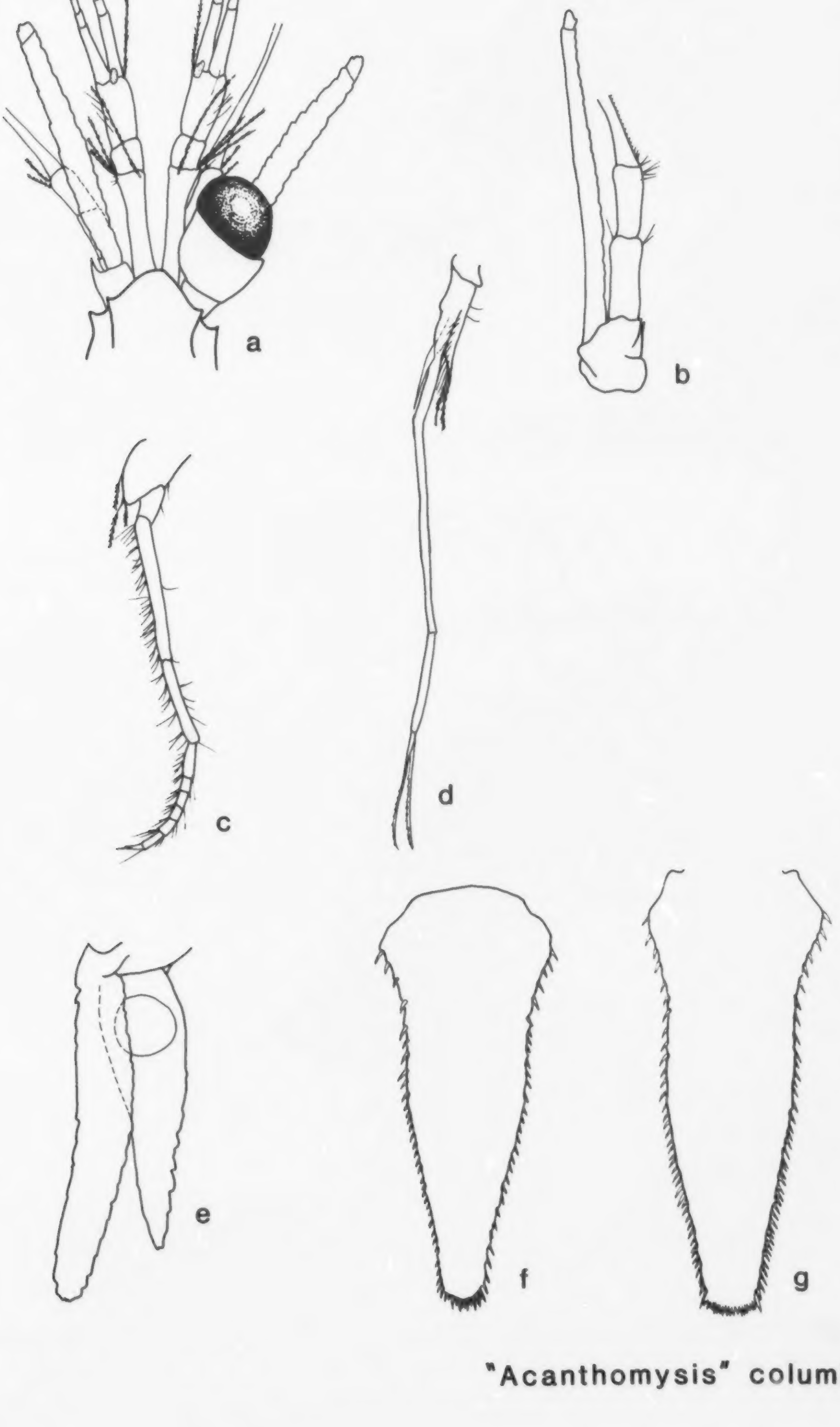
Color. Secondary small dark spot medial to the dark cornea in B.C. specimens.

TAXONOMIC NOTES Holmquist (4) notes that the joint shown in the 4th male pleopod by (3) is an artifact. The curvature of the telson apex may vary, perhaps between California and British Columbia populations. More material is needed to assess these and other variations.

ECOLOGICAL NOTES Observed schooling in crevices and in the lee of boulders in shallow waters of the Strait of Georgia, British Columbia (J. Marliave, pers. comm.). Gray whales were feeding on swarms of this species and Holmesimysis sculpta in Pachena Bay, British Columbia (P. Slattery, pers. comm.).

DISTRIBUTION British Columbia, California, 5-7 m.

Figure. a. dorsal view anterior end, male (3); b. antennal scale (1); c. 5th thoracopod (3); d. 4th pleopod, male (3); e. uropod (4); f. telson, California specimen (3); g. telson, British Columbia specimen (1).



"Acanthomysis" columbiae

"Acanthomysis" cf. Paracanthomysis

SYNONYMY AND REFERENCES

Orientomysis Derzhavin, 1913 (in part)

Acanthomysis Ii, 1936

Non Acanthomysis of Holmquist, 1981b (1)

"Acanthomysis" by Holmquist, 1981a (2)

CHARACTERIZATION (1)

Carapace. Anterolateral margins pointed. Rostrum with straight sides, forming an acute angle at pointed apex.

Eyes. Normally developed with single approximately hemispherical cornea; overall length <1.5X mid-stalk width, much shorter than antennal scale; eyestalk with mid-dorsal papilla.

Antennules. No data for male.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed anterior.

Thoracopods. 3rd-8th with carpo-propodus of endopod 4-7 segmented.

Oostegites. 2 pairs.

Abdomen. All segments with 2 to 3 folds.

Pleopods. All rudimentary in females, no data on males.

Uropods. 4-5 spines on lower inner margin of endopod adjacent to statocyst.

Telson. Narrowly triangular, length 3.5X width, with truncate apex. Large and small lateral spines full length of margins with tendency to size grouping distally, increasing in size apically. Apex has 1 pair of large spines with 1 pair of small spines between, no plumose setae.

TAXONOMIC NOTES The restricted definition of Acanthomysis by (1) forces the removal of many species to other genera including two species for which no adult males are known. Since males are necessary for generic assignment in her system, the species "Acanthomysis" stelleri and "Acanthomysis" borealis are left in limbo. Holmquist (2) suggests that the rounded telson apex is similar to that in Paracanthomysis kurilensis Ii, 1936. The differences between round in "Acanthomysis" cf. Paracanthomysis and narrowly truncate in Exacanthomysis are not obvious except when specimens or illustrations are side by side. The annotation cf. (compare with) Paracanthomysis is employed here only to identify the species borealis and stelleri which at present have no generic assignment.

"Acanthomysis" (cf. Paracanthomysis) borealis (Banner, 1954)

SYNONYMY AND REFERENCES

Acanthomysis species Banner, 1948b (1)

Acanthomysis borealis Banner, 1954c (2)

"Acanthomysis" borealis by Holmquist, 1981a (3)
Holmquist, 1982 (4)

"Acanthomysis" (cf. Paracanthomysis) borealis by Authors

CHARACTERIZATION (1, 2, 3)

Antennal scale. Length 7 times width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 5-7 segmented.

Abdomen. 1st segment with 2 grooves, posterior incomplete dorsally; 2nd-4th segments with 2 grooves but posterior one poorly defined; heavy ridge in middle of 5th (discontinuous at midline) projecting on either side as a lobe, posteriorly a heavy fold, near posterior margin another fold, posterior margin projects over as rounded lobe; 6th as 5th but folds heavier and all discontinuous at midline.

Uropods. 4 spines on lower, inner margin adjacent to statocyst.

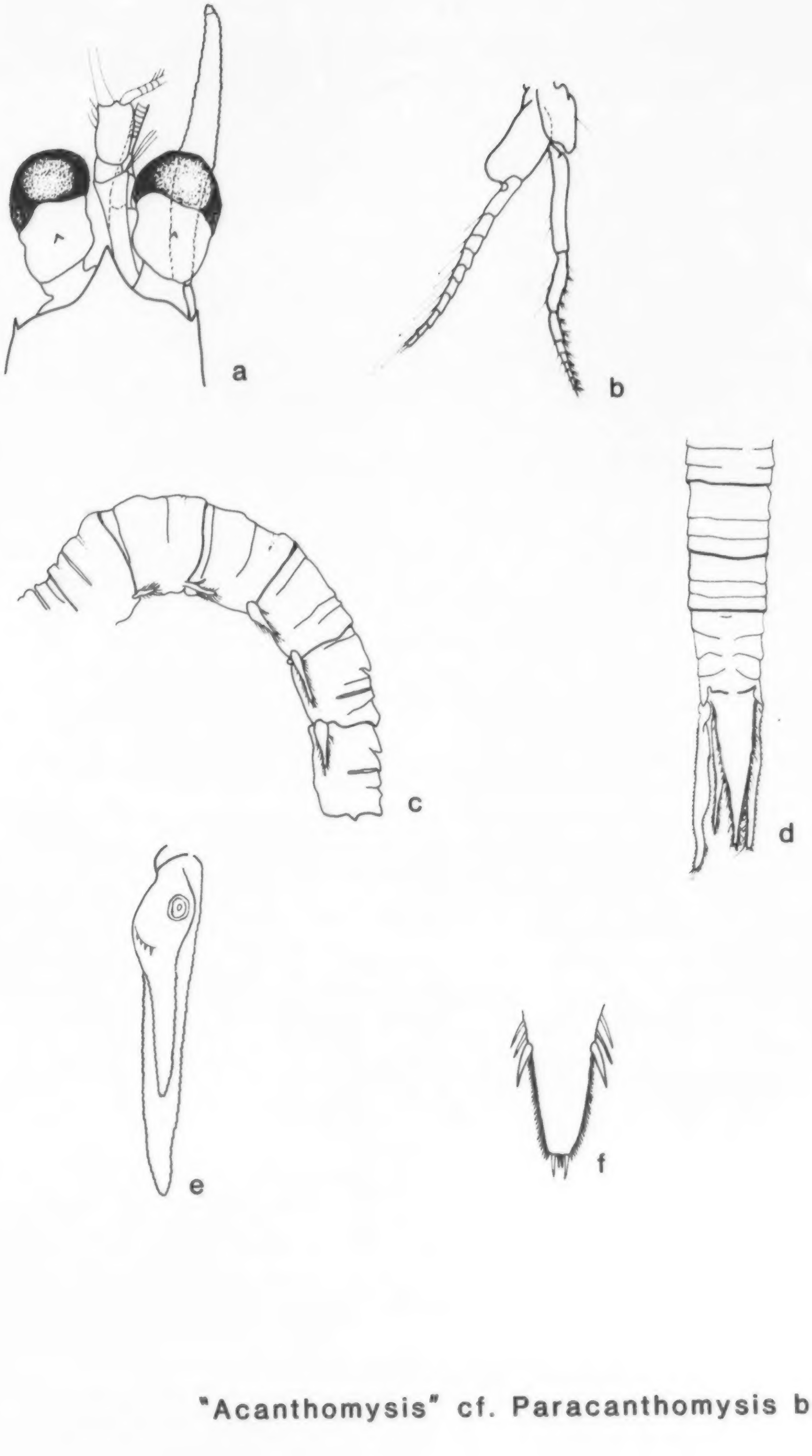
Telson. Length 3.5X basal width. Lateral spines of anterior half subequal in length; from middle to near tip alternating size groups, with 2-6 small spines between large ones; in posterior tenth subequal.

Size. Banner's (2) mature female was 19 mm.

TAXONOMIC NOTES May be some variability in degree that folds extend over the midline or are otherwise developed. Banner (2) states that the telson apex is so narrowly truncate that it at first appears rounded, the only character used by (1) to separate it from "A". stelleri (with a truncate telson apex). Holmquist (3) suggests that "A". borealis may prove to be identical to "A". stelleri. Her (3) drawings are of the immature female paratype, while (2) are of the mature female type specimen.

DISTRIBUTION Alaska, coastal waters in 80 m (1, 2, 3, 4).

Figure. a. dorsal view, anterior end (2); b. 6th thoracopod (2); c. abdomen, lateral view (2); d. abdomen and telson, dorsal view (3); e. uropod (2); f. telson tip (2).



"Acanthomysis" cf. Paracanthomysis borealis

"Acanthomysis" (cf. Paracanthomysis) stelleri (Derzhavin, 1913)

SYNONYMY AND REFERENCES

Orientomysis stelleri Derzhavin, 1913 (1)

Acanthomysis stelleri by Ii, 1936
Banner, 1948b (2) Banner, 1954c (3) Ii, 1964 (4)

"Acanthomysis" stelleri by Holmquist, 1981a (5)
Holmquist, 1982 (6)

"Acanthomysis" (cf. Paracanthomysis) stelleri (Derzhavin, 1913)

Non Acanthomysis stelleri of W. Tattersall, 1951 (7) (=?E. davisi)

CHARACTERIZATION (1, 3, 4, 5)

Antennal scale. Length 7 times width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 4-6 segmented.

Abdomen. With 2 or 3 folds on each segment.

Uropods. 5 spines on lower, inner margin adjacent to statocyst.

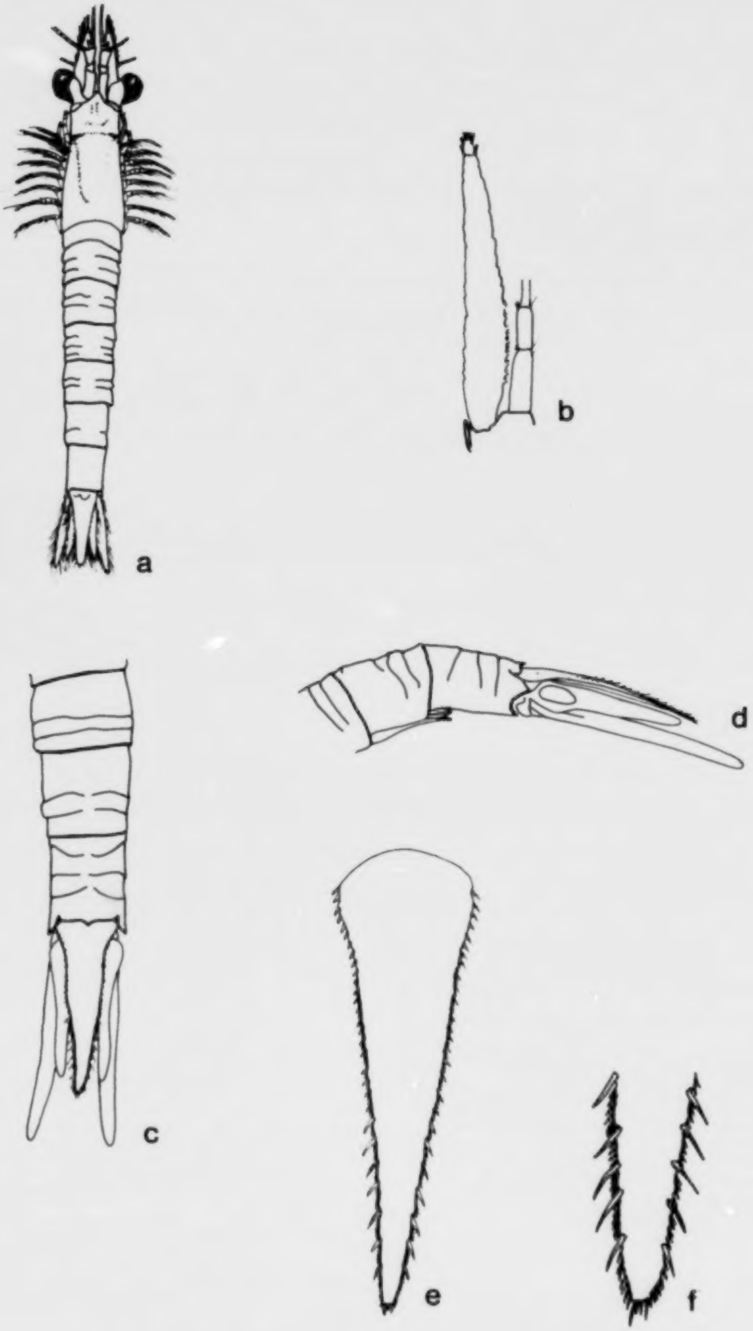
Telson. Length 3.5 times basal width. Large lateral spines increase in size distally, but those near middle distal half are longest; 8-10 small spines between larger spines.

Size. 20 mm.

TAXONOMIC NOTES Banner's (2) key placing "A". stelleri among species with a truncate rather than rounded apex is a difference in interpretation rather than in appearance. Material suggested to be this species by (7) is in poor condition; (4) suggested it might be Exacanthomysis davisi while (5) suggested E. arctopacifica, and (5) further suggests "A". stelleri and "A". borealis may be the same. Descriptions of the abdominal folds by (1) and (3) do not agree with 5 badly damaged specimens from the Bering Sea, identified by W. Tattersall and examined by us. They more closely resemble "A". borealis. Caution should be used when identifying either of these species.

DISTRIBUTION Northwest Pacific, Bering Sea and east to southern Alaska; in shallow coastal water (4, 5, 6).

Figure. a. dorsal view (1 and posterior ends 1, 3); b. antennal scale (1); c. abdomen, dorsal view (5); d. abdomen, lateral view (5); e. telson (5); f. telson apex (5).



"Acanthomysis" cf. Paracanthomysis stelleri

Alienacanthomysis Holmquist, 1981

SYNONYMY AND REFERENCES

Alienacanthomysis Holmquist, 1981 b (1)
Holmquist, 1982

Neomysis (in part)

Acanthomysis (in part)

CHARACTERIZATION (1)

Carapace. Anterolateral margins pointed. Rostrum with straight sides, forming a rounded obtuse angle at apex.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Rounded anterior.

Thoracopods. 1st with gnathobase on 2nd segment only; 3rd-8th carpo-propodus of endopod 5-7 segmented.

Oostegites. 2 pairs of ordinary and 1 anterior rudimentary pair; no hair tufts; no baling lobe.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females. All but 4th rudimentary in males, increasing in length from 1st-5th, but 5th not exceptionally long. Male 4th reaching at least to last abdominal segment; endopod short; exopod slender, 2 segmented, distal segment length <1/10 proximal; 2 terminal barbed setae.

Uropods. One spine on lower inner margin of endopod adjacent to statocyst.

Telson. Linguiform with rounded apex. Spines full length of margins with tendency to size grouping distally, but smaller and more equal around apex.

TAXONOMIC NOTES Similar to Xenacanthomysis but eyes longer relative to width and labrum rounded. In males, differentiated by 4th pleopod (Xenacanthomysis has short, stout exopod with no apparent subdivision) and by no knobbed processes on antennules.

Alienacanthomysis macropsis (W. Tattersall, 1932)

SYNONYMY AND REFERENCES

Neomysis macropsis W. Tattersall, 1932 (1)
W. Tattersall, 1933 (2)

Acanthomysis macropsis by Ii, 1936
Banner, 1948b (3)
Banner, 1954d
Ii, 1964 (4)
Fulton, 1968
Holmquist, 1980 (5)
Kozloff, 1974
W. Tattersall, 1951 (6)
Wailes, 1929

Alienacanthomysis macropsis by Holmquist, 1981b (7)
Holmquist, 1982 (8)

CHARACTERIZATION (1, 3, 4, 5, 6, 7)

Eyes. Elongated and narrow; length 3.5X mid-stalk width, longer than antennal scale and peduncle, reaching to distal end of 2nd segment of antennular peduncle.

Antennal scale. Apex extends to 2nd segment of antennular peduncle, length 6 times width.

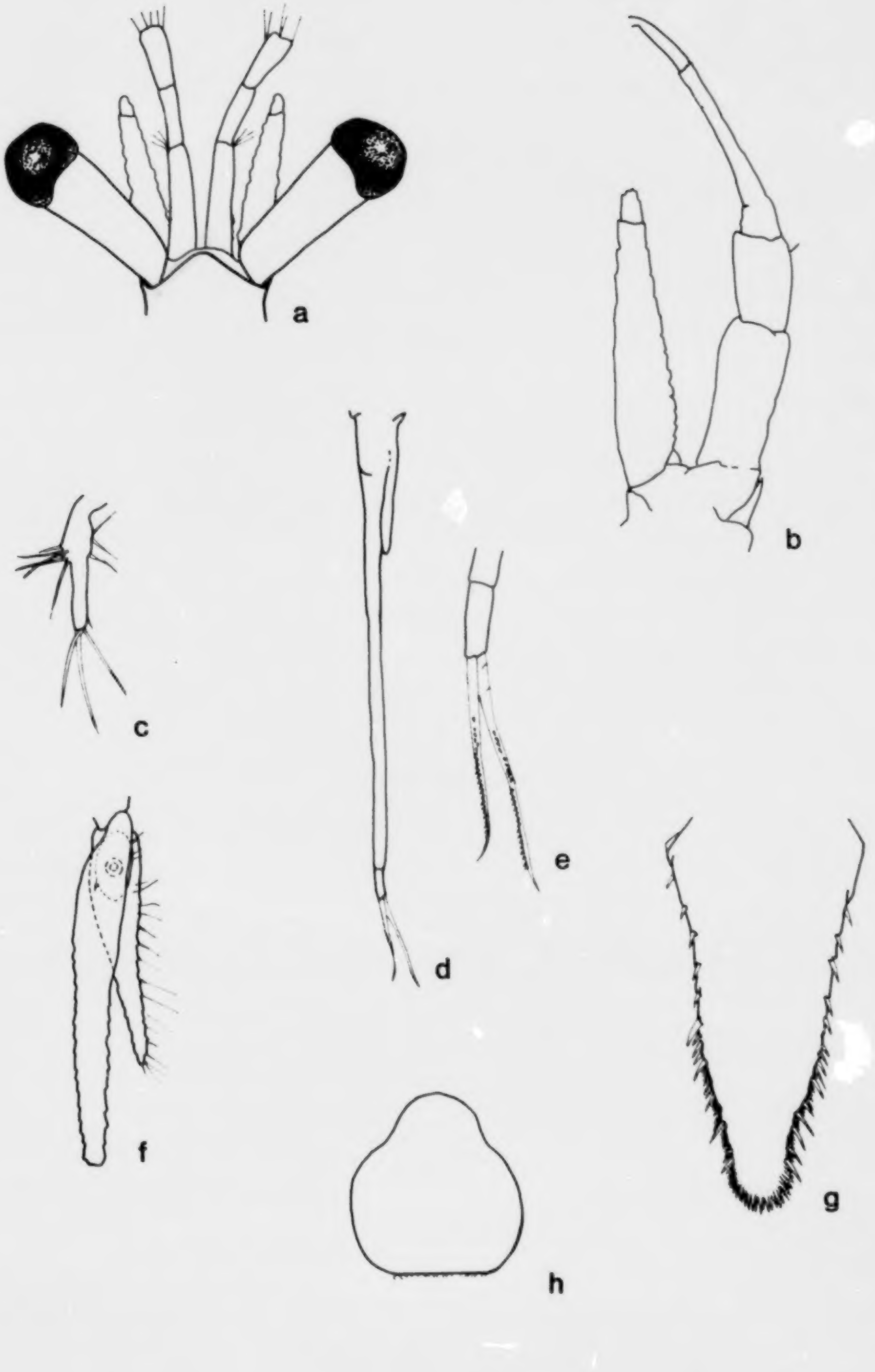
Telson. Length 2-2.5 times basal width. 13-15 well spaced large spines on each margin except absent on distal 1/6; groups of small spines between distal 4 or 5 large spines.

Size. To 14 mm.

TAXONOMIC NOTES Juvenile *Xenacanthomysis pseudomacropsis* specimens may have similar eyes but differ in other characters.

DISTRIBUTION Southern Alaska to southern California; neritic, shallow water, may be epibenthic (1, 2, 3, 5, 6, 7, 8).

Figure. a. dorsal view, anterior end (1); b. antenna (7); c. 3rd male pleopod (1); d. 4th male pleopod (7); e. 4th male pleopod, distal end (7); f. uropod (1); g. telson (7); h. labrum (original).



Alienacanthomysis macropsis

Amblyops G.O. Sars, 1872

SYNONYMY AND REFERENCES

Amblyopsis G.O. Sars, 1869

Amblyops G.O. Sars, 1872

Banner, 1948a (1)	G.O. Sars, 1885a
Ii, 1964 (2)	Tattersall and Tattersall, 1951 (5)
Mauchline, 1980 (3)	O. Tattersall, 1955 (6)

CHARACTERIZATION (1, 2, 5, 6)

Carapace. No rostral projection.

Antennules. Peduncle short, stout.

Antennae. Peduncle with 4 segments, scale with distal lobed margin subequal to distal outer spine. An articulation at apex may be obscure.

Eyes. A pair of separate immovable plates; may be contiguous on inner margin but not fused; retina functional although obvious visual pigment may be limited to flecks of red or pink.

Labrum. Symmetrical.

Thoracopods. 2nd-8th with carpus divided from propodus by oblique articulation; propodus divided into two parts by a transverse articulation. 8th with short, thick genital appendage in male.

Oostegites. 2 pairs.

Pleopods. All biramous, natatory in male; rudimentary, unsegmented plates in female.

Uropods. Exopod undivided, its outer margin with setae but no spines. Endopod much shorter than exopod; statocyst evident.

Telson. Linguiform, apex entire, not cleft although may be slight indentation.

TAXONOMIC NOTES 11 species recorded (3); 1 found locally.

DISTRIBUTION Meso- and bathypelagic in all oceans (3).

Amblyops abbreviata (G.O. Sars, 1869)

SYNONYMY AND REFERENCES

Amblyopsis abbreviata G.O. Sars, 1869

Pseudomma abbreviatum M. Sars, 1869

Amblyops abbreviata G.O. Sars, 1872 (1)
Banner, 1948a (2)
Banner, 1954d
Birstein and Tchindonova, 1958 (3)
Ii, 1964 (4)
Mauchline and Murano, 1977 (5)
Nouvel, 1950
W. Tattersall, 1951 (6)
Tattersall and Tattersall, 1951 (7)
Wigley and Burns, 1971 (8)
Zimmer, 1904
Zimmer, 1909 (9)

CHARACTERIZATION (1, 2, 4, 6, 7, 9)

Antennules. Peduncle < ½ length of antennal scale; 3rd segment equal to or greater than combined length of 1st 2nd segments.

Antennal scale. Length at least 3½X width. Accessory spine at base of terminal spine.

Eyes. Anterior border of ocular plate microscopically spinulose; eye papilla large, with acute tip.

Uropods. Endopod with single short blunt spine, ventrally adjacent to statocyst.

Telson. 25-32 spines along distal 2/3 of each lateral margin, increasing in length distally with longest at rounded apex, longest less than ½ width of telson midway along the spined portion. Pair of plumose setae at apex.

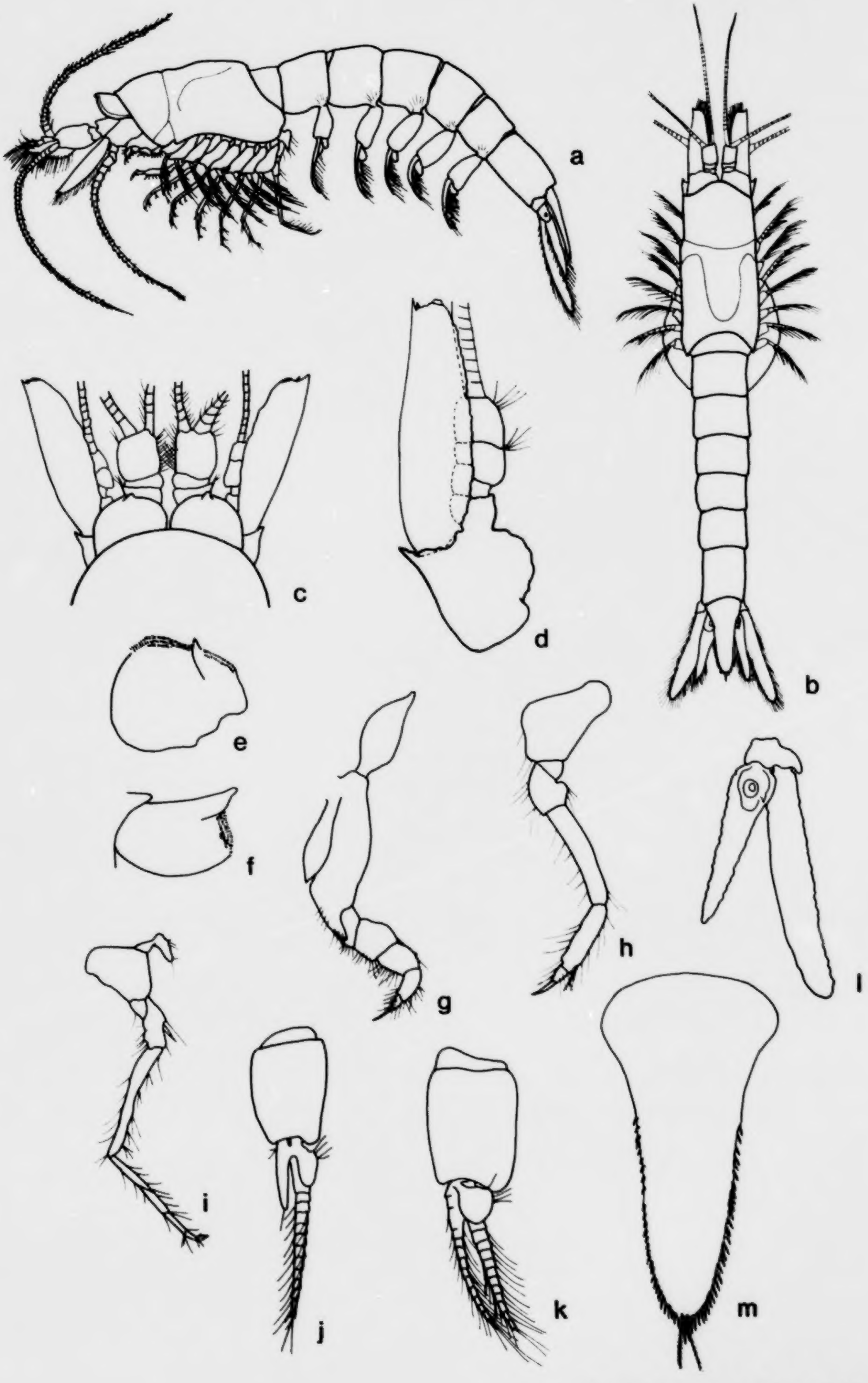
Size. 10-18 mm.

Color. Anterior transparent and colorless except for eyeplates and internal structures; may be light red pigment on abdomen.

TAXONOMIC NOTES Tattersall (6) notes small differences between Pacific and Atlantic individuals: Pacific - more spines on lateral margins, process on anterior median border of eye is longer and more acute, and spinules of ocular plate are larger. These differences, however, are well within allowable limits.

DISTRIBUTION Bathypelagic in North Atlantic and North Pacific, 183-1375 m (3, 5, 7). In NE Pacific from Alaska and British Columbia, 300-500 m (2, 6).

Figure. a. lateral view, male (7); b. dorsal view, female (9); c. dorsal view, anterior end (7); d. antenna (7); e. dorsal view, eye (6); f. lateral view, eye (6); g. 1st thoracopod (7); h. 2nd thoracopod (7); i. 8th thoracopod (7); j. 1st male pleopod (7); k. 4th male pleopod (7); l. uropod (7); m. telson (6).


a
b
c
d
e
f
g
h
i
j
k
l
m

Amblyops abbreviata

Archaeomysis Czerniavsky, 1882

SYNONYMY AND REFERENCES

Archaeomysis Czerniavsky, 1882b (1)		
Holmquist, 1975 (2)	Ii, 1964 (3)	Mauchline, 1980 (4)
Callomysis Holmes, 1895		
Hansen, 1910	W. Tattersall, 1932	

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Expanded posteriorly into large rounded lobes.

Antennal scale. Small, does not extend beyond distal end of 2nd segment of antennular peduncle.

Labrum. With strong frontal spiniform process.

Thoracopods. 3rd-8th with carpo-propodus of endopod 7-13 segmented.

Oostegites. 2 pairs of lamellae.

Abdomen. Pleura of 1st segment expanded into large rounded plates in female; present but smaller in male. 5th segment without dorsal spine but may be a short median projection.

Pleopods. Biramous in females and males; in male 3rd with exopod greatly elongated but no copulatory organ and endopod 4-7 segmented.

Uropods. Exopod undivided, outer margin with spines, not setose; large statocyst.

Telson. Margins spinose, apical cleft with spinose margins.

TAXONOMIC NOTES Two species recorded; 1 occurs locally. Archaeomysis maculata (Tattersall, 1951) now assigned to Bowmaniella (2). Close to genus Gastrosaccus but differs in biramous condition of pleopods in female and absence of copulatory organ on 3rd pleopod of male for Archaeomysis.

DISTRIBUTION North Pacific.

Archaeomysis grebnitzkii Czerniavsky, 1882

SYNONYMY AND REFERENCES

Archaeomysis grebnitzkii Czerniavsky, 1882
Banner, 1948a (1)
Banner, 1954c
Banner, 1954d
Czerniavsky, 1887 (2)
Holmquist, 1975 (3)
Holmquist, 1982 (4)
Ii, 1964 (5)
Kozloff, 1974
Kozloff, 1983 (7)
Mauchline and Murano, 1977 (8)
Smith and Carlton, 1975
W. Tattersall, 1951 (9)
Zimmer, 1904

Archaeomysis maculata Holmes, 1895 (10)
Banner, 1948a
Holmquist, 1975

NOT *Archaeomysis maculata* of W. Tattersall, 1932 (11) and 1951 (9)
(=*Bowmaniella banneri* Bascescu, 1968) (12)

Callomysis maculata Holmes, 1895
Holmes, 1895
Hansen, 1910

CHARACTERIZATION (1, 2, 3, 5, 9)

Rostrum. Apex bluntly rounded, slight ventral bend gives truncate appearance dorsally.

Eyes. Cornea globose, wider than stalk.

Thoracopods. None with nail; papilla on basal part of exopod.

Pleopods. In male 2nd and 3rd with endopods 4-7 segmented; 1st, 4th and 5th with endopods 1 segmented.

Uropods. Inner surface of endopod with 6-8 spines; 1-3 near statocyst.

Size. 9-21 mm.

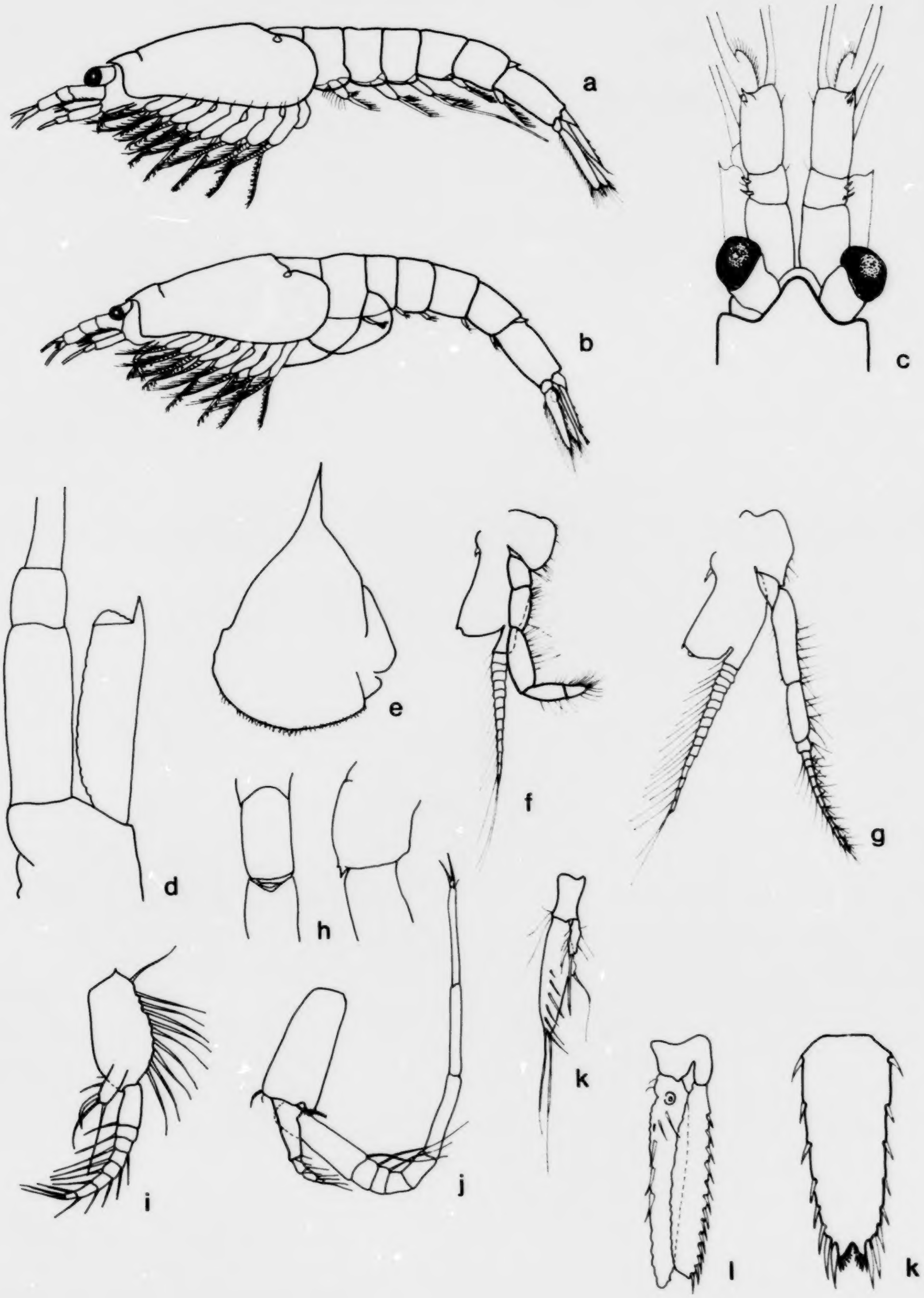
Color. Light sand with dark patches and streaks; photograph in (7).

TAXONOMIC NOTES Pleura of 2nd abdominal segment not expanded in female (1, 3). Specimens from central California described by (10) as *Callomysis (Archaeomysis) maculata* not considered identical with *A. grebnitzkii*; some populations from southern California referred to *C. (A.) maculata* (9, 11) now placed in a separate genus (3, 12).

ECOLOGICAL NOTES Benthic on sand, gravel, mud bottoms; may burrow (3, 7).

DISTRIBUTION NW Pacific to central California (3).

Figure. a. lateral view, male (5); b. lateral view, female (5); c. dorsal view, anterior end (5); d. antenna (5); e. labrum (3); f. 2nd thorocopod (5); g. 7th thoracopod (5); h. dorsal and lateral views, 5th abdominal segment (3); i. 1st male pleopod (9); j. 3rd male pleopod (9); k. 3rd female pleopod (9); l. uropod (9); m. telson (9).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Archaeomysis grebnitzkii

Boreomysis G.O. Sars, 1869

SYNONYMY AND REFERENCES

Boreomysis G.O. Sars, 1869
Banner, 1948a
Birstein and
  Tchindonova, 1958 (1)
Ii, 1964 (2)
Mauchline, 1980 (3)
Mauchline and Murano, 1977 (4)
Tattersall and Tattersall, 1951 (5)
O. Tattersall, 1955 (6)

CHARACTERIZATION (1, 2, 3, 5)

Antennules. Outer flagellum swollen at base and with long sensory hairs.

Antennal scale. Outer margin smooth, no setae, terminating in a spine.

Labrum. Broader than long, without frontal spine.

Maxillules. Without palp.

Maxillae. Terminal segment of palp somewhat expanded.

Thoracopods. 1st with gnathobasic lobes on 2nd and 3rd segments of endopod; 2nd with terminal segment short, stout and densely setose; 3rd-8th with propodus 2-3 segmented.

Oostegites. Seven pairs.

Pleopods. In males, well developed, biramous; exopod of pairs 2 and 3 elongated and on one or both modified distally. In females, rudimentary but with very short basal article and elongated distal article.

Uropods. Exopod with rudimentary transverse joint; outer margin of joint with 1-2 spines but no setae. Small statocyst.

Telson. Cleft at apex, with small spines.

TAXONOMIC NOTES 36 species enumerated in 1980 (3). Key to species in (6). Can be considerable variations in single species with sex and size (6). May be a number of unrecognized synonyms (2).

DISTRIBUTION All meso- or bathypelagic.

Boreomysis arctica (Kroyer, 1861)

SYNONYMY AND REFERENCES

Mysis artica Kroyer, 1861

Boreomysis arctica G.O. Sars, 1869
Birstein and Tchindonova, 1958 (1)
Ii, 1964 (2)
Nouvel, 1950 (3)
W. Tattersall, 1951 (4)
Tattersall and Tattersall, 1951 (5)
O. Tattersall, 1955 (6)

Arctomysis arctica Czerniavsky, 1883

CHARACTERIZATION (1, 2, 4, 5)

Rostrum. Margins slightly convex, forming acute angle, pointed at apex.

Antennules. Peduncle slightly greater than ½ length of antennal scale.

Antennal scale. Length 5 times width (4 times in B. intermedia). Apex truncate, shorter than spine on outer margin.

Eyes. Cornea larger than stalk; stalk very narrow proximally (broader in B. intermedia).

Thoracopods. 2nd with no subchelate termination; propodus of 3rd-8th 2 segmented.

Pleopods. Only 3rd of male modified, exopod longer than endopod and short, spiniform setae replace plumose setae on last 5 segments.

Uropods. 2 spines at outer margin of joint (1 in B. intermedia); 2 spines on lower inner margin adjacent to statocyst.

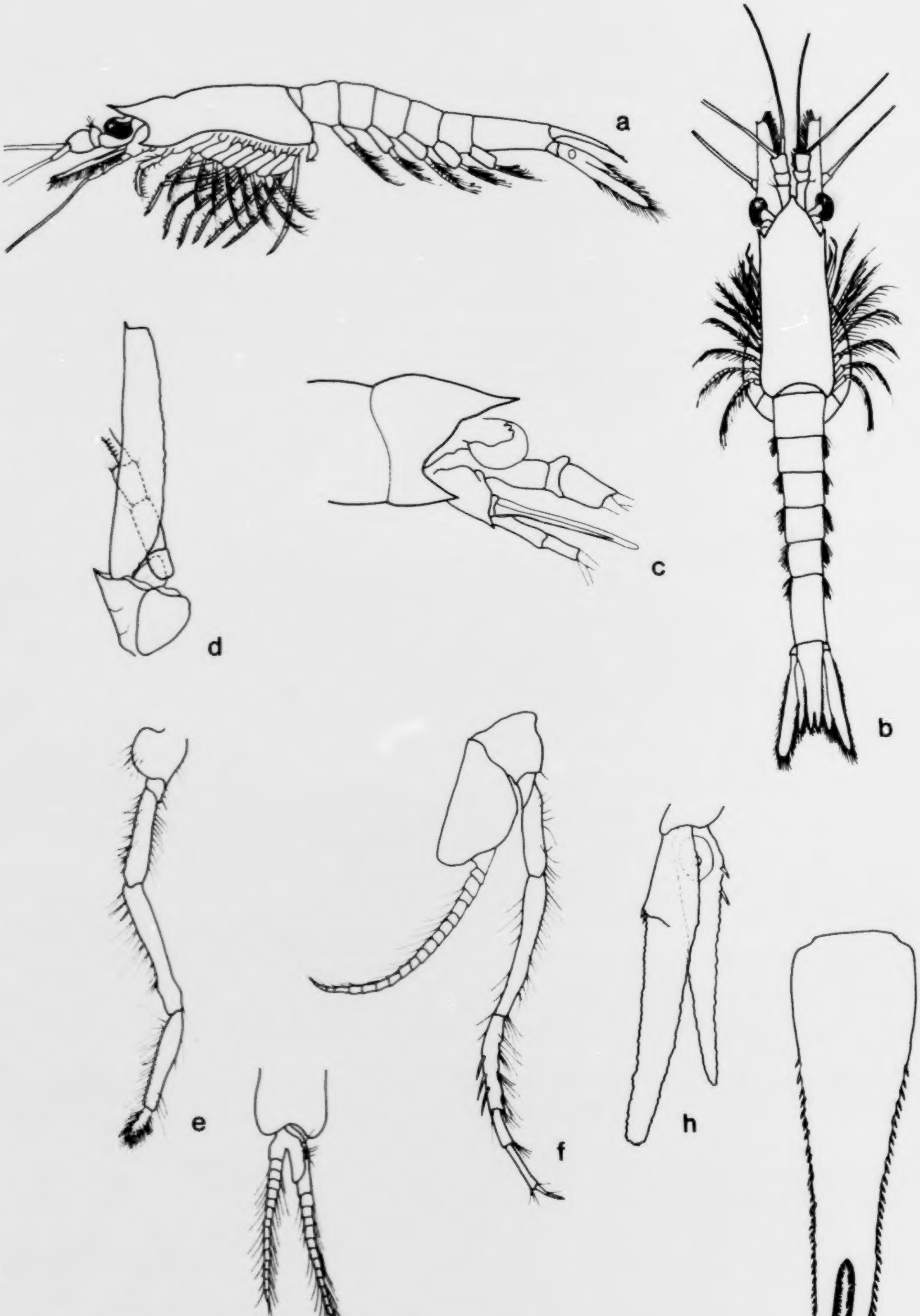
Telson. Distal ½ with concave sides; about 4 spines on distal 2/3 of lateral margins; apical cleft 1/5 of total length. 3 larger apical spines on each side of cleft; no plumose setae.

Size. To 27 mm.

TAXONOMIC NOTES The only published record in the temperate NE Pacific is of an immature female (4). Ii (2) describes a species from Japan, B. intermedia which differs only in small details from B. arctica. The illustration of B. arctica by (1) shows characters of both species. California and other North Pacific records may pertain to B. intermedia if it is distinct from B. arctica.

DISTRIBUTION Arctic, North Atlantic, Mediterranean, NW Pacific, 365-1900 m. NE Pacific from Bering Sea and one record from central California.

Figure. a. lateral view, male (3); b. dorsal view, female (5); c. lateral view, anterior end (1); d. antennal scale (5); e. endopod of 2nd thoracopod (5); f. 3rd thoracopod (5); g. 3rd male pleopod (5); h. uropod (5); i. telson (5).



Boreomysis arctica

Boreomysis californica Ortmann, 1894

SYNONYMY AND REFERENCES

Boreomysis californica Ortmann, 1894 (1)
Banner, 1948a (2)
Banner, 1954b (3)
Birstein and Tchindonova, 1958 (4)
Birstein and Tchindonova, 1962
Ii, 1964 (5)
Pearcy et al., 1977 (6)
Taniguchi, 1969 (8)
W. Tattersall, 1951 (9)
O. Tattersall, 1955 (10)

Boreomysis kincaidi Banner, 1948a (2)
Banner, 1954d (3)

Boreomysis media Hansen, 1912
W. Tattersall, 1951 (9)

CHARACTERIZATION (1, 2, 3, 9)

Rostrum. Margins slightly convex, forming an acute angle; pointed at apex.

Antennules. Peduncle extends about 2/3 length of antennal scale.

Antennal scale. Length 3 times width; apex slightly longer than outer spine.

Eyes. Cornea 2/3 to equal width of proximal stalk; dorsal papilla large, 1/5 to ½ diameter of adjacent stalk.

Thoracopods. 2nd with no subchelate termination, but dactyl may reflex back at right angles to protopod.

Pleopods. 2nd male with exopod 2½X length of endopod.

Uropods. 1 spine on outer margin of exopod. Endopod with 1 spine on lower inner margin adjacent to statocyst.

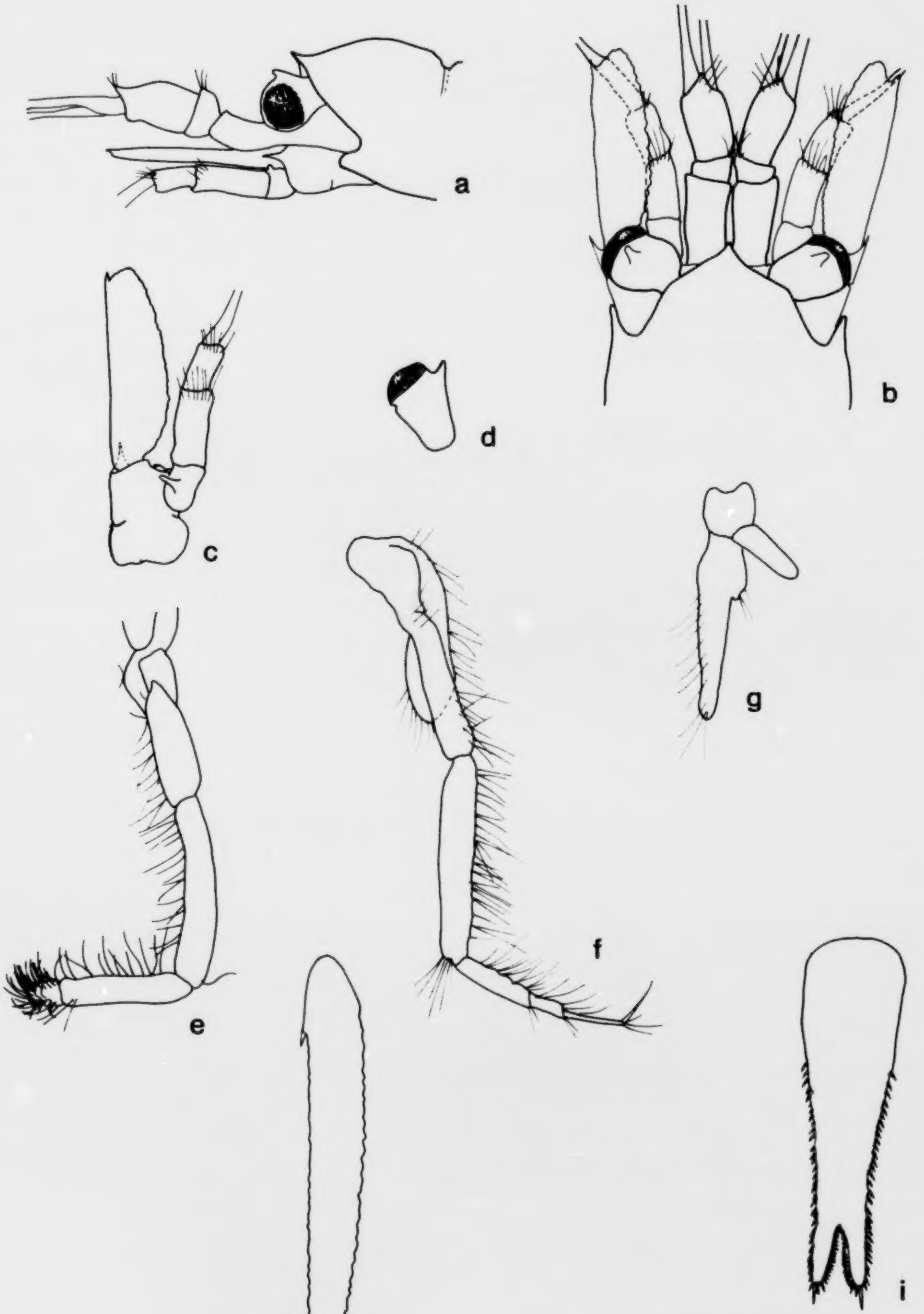
Telson. Distal half with concave sides; 30-32 lateral teeth; apical cleft 1/6 total length. 3 larger apical spines on each side.

Size. 17-24 mm.

TAXONOMIC NOTES Banner (3) discusses variability within the population including characters for *B. californica* (9) and *B. kincaidi* (2). Ii (5) notes distinguishing characters from other similar forms. *B. californica longirostris* from south of the Aleutians has been described by (4), who also consider *B. kincaidi* a synonym of *B. plejeba* Hansen, 1910.

DISTRIBUTION Bathypelagic in North Pacific, and as *B. media* in SE Pacific, Indian and Atlantic Oceans. NE Pacific from Bering Sea south to Gulf of California, 50-1500 m (2, 4, 5, 6, 8).

Figure. a. lateral view, anterior end (9); b. dorsal view, anterior end (9); c. antenna (9); d. lateral view, eye (9); e. endopod of 2nd thoracopod (9); f. 3rd thoracopod (9); g. 3rd female pleopod (2); h. exopod of uropod (9); i. telson (9).



Boreomysis californica

Boreomysis inermis (Willemoes-Suhm, 1874)

SYNONYMY AND REFERENCES

Petalophthalmus inermis Willemoes-Suhm, 1874 (1)
Petalophthalmus armiger (female) of Willemoes-Suhm, 1875
Boreomysis scyphops of G.O. Sars, 1885a (2)
Hansen, 1908 (3)
Non Nouvel, 1950
Non G.O. Sars, 1885b (4)

Boreomysis suhmi Faxon, 1893 (5)
Boreomysis distinguenda Hansen, 1908 (3)
Boreomysis inermis
Birstein and
  Tchindonova, 1958 (6)
Non Hansen, 1910
Ii, 1964 (7)
Non Illig, 1930
Mauchline and Murano, 1977
W. Tattersall, 1951 (8)
O. Tattersall, 1955 (9)

CHARACTERIZATION (2, 6, 7, 8)

Rostrum. Slightly convex sides form approximate right angle; apex short.

Antennules. Peduncle <½ length of antennal scale.

Antennal scale. Length 4½X width; spine extends beyond slightly rounded apex.

Eyes. Blind, unpigmented, concave outer surface; oblong in lateral view (*B. scyphops* is more circular).

Thoracopods. 2nd subchelate with propodus concave to receive dactyl.

Uropods. Transverse articulation of exopod obscure; if present, number of spines on outer margin may vary; endopod with 2 spines on lower inner margin adjacent to statocyst.

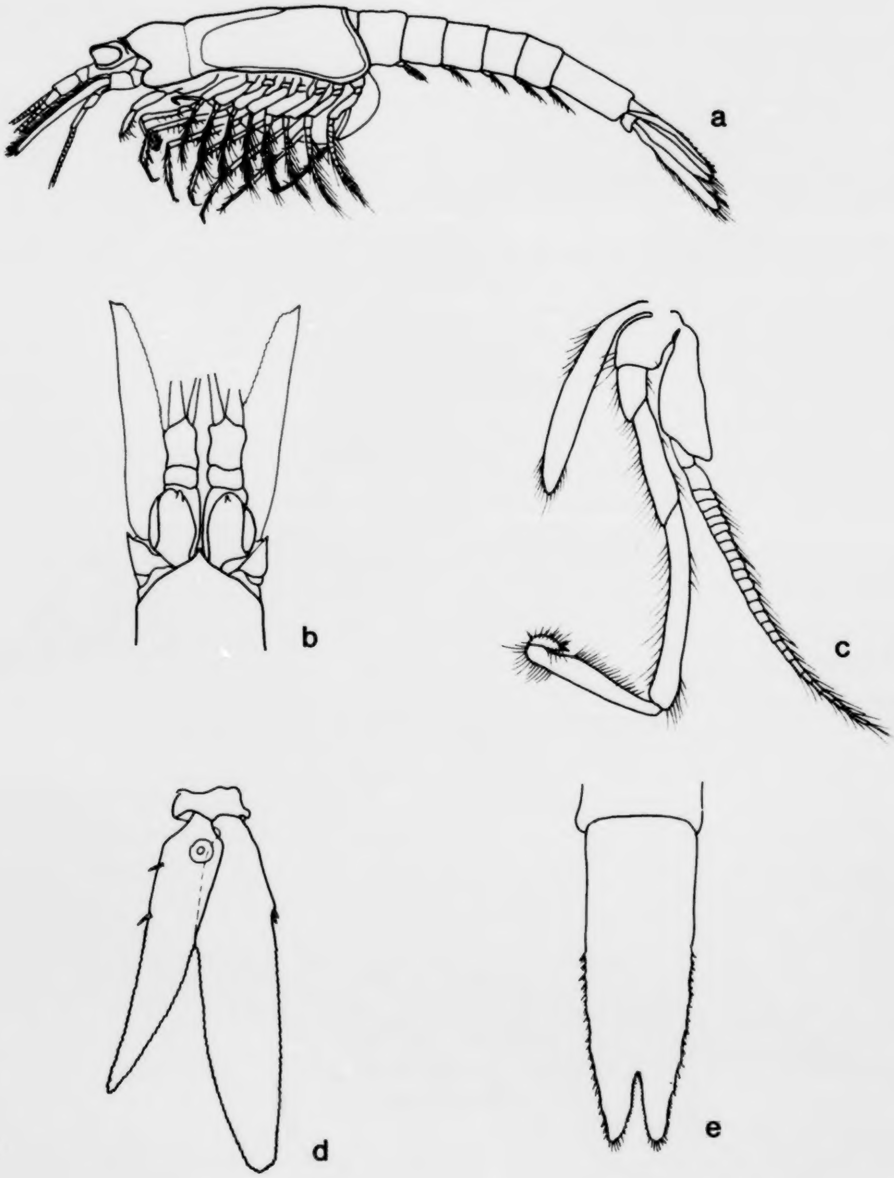
Telson. Distal half with convex sides. Apical cleft 1/5 total length. Distal spines unequal in length.

Size. To 60 mm.

TAXONOMIC NOTES Named but not described by (1), but (2) considered it identical to *B. scyphops* and retained that name. Subsequently regarded as separate species under several names (3, 5, 6, 7, 8, 9). Descriptions by (2) and (6) differ in form of telson cleft and spination on uropods.

DISTRIBUTION South Atlantic, Antarctic and Pacific, 900-3800 m (6, 7, 8). NE Pacific from Bering Sea to southern California.

Figure. a. lateral view, female (2); b. dorsal view, anterior end (6); c. 2nd thoracopod (2); d. uropod (6); e. telson (6).



Boreomysis inermis

Boreomysis microps G.O. Sars, 1883

SYNONYMY AND REFERENCES

Boreomysis microps Sars, 1880

?Banner, 1948a (1)
?Banner, 1954d (2)
Birstein and Tchindonova, 1958 (3)
Holmquist, 1957b (4)
Mauchline, 1980
Mauchline and Murano, 1977 (5)
Nouvel, 1943
Nouvel, 1950
Sars, 1885a (6)
W. Tattersall, 1951
Tattersall and Tattersall, 1951 (7)
O. Tattersall, 1955 (8)
Zimmer, 1909 (9)

Boreomysis subpellucida Hansen, 1905a

CHARACTERIZATION (6, 7, 9)

Rostrum. Strongly convex, two sides forming obtuse angle; apex pointed.

Antennules. Peduncle extends to distal 1/4-1/6 of antennal scale.

Antennal scale. Length 4 times width.

Eyes. Cornea small in dorsal view, less than diameter of stalk; larger in lateral view, appearing ovate; stalk appears inflated with convex margins; well developed dorsal papilla.

Thoracopods. 2nd with single large blunt spine on distal margin of carpus which, with the short propodus, forms weak chela.

Pleopods. 3rd of male modified, as in *B. arctica*.

Uropods. 1 spine at outer margin of joint on exopod; 1 spine on inner margin of endopod near statocyst.

Telson. Distal half with concave sides; apical cleft 1/6 to 1/8 total length; dilated at proximal end.

Size. 28 mm.

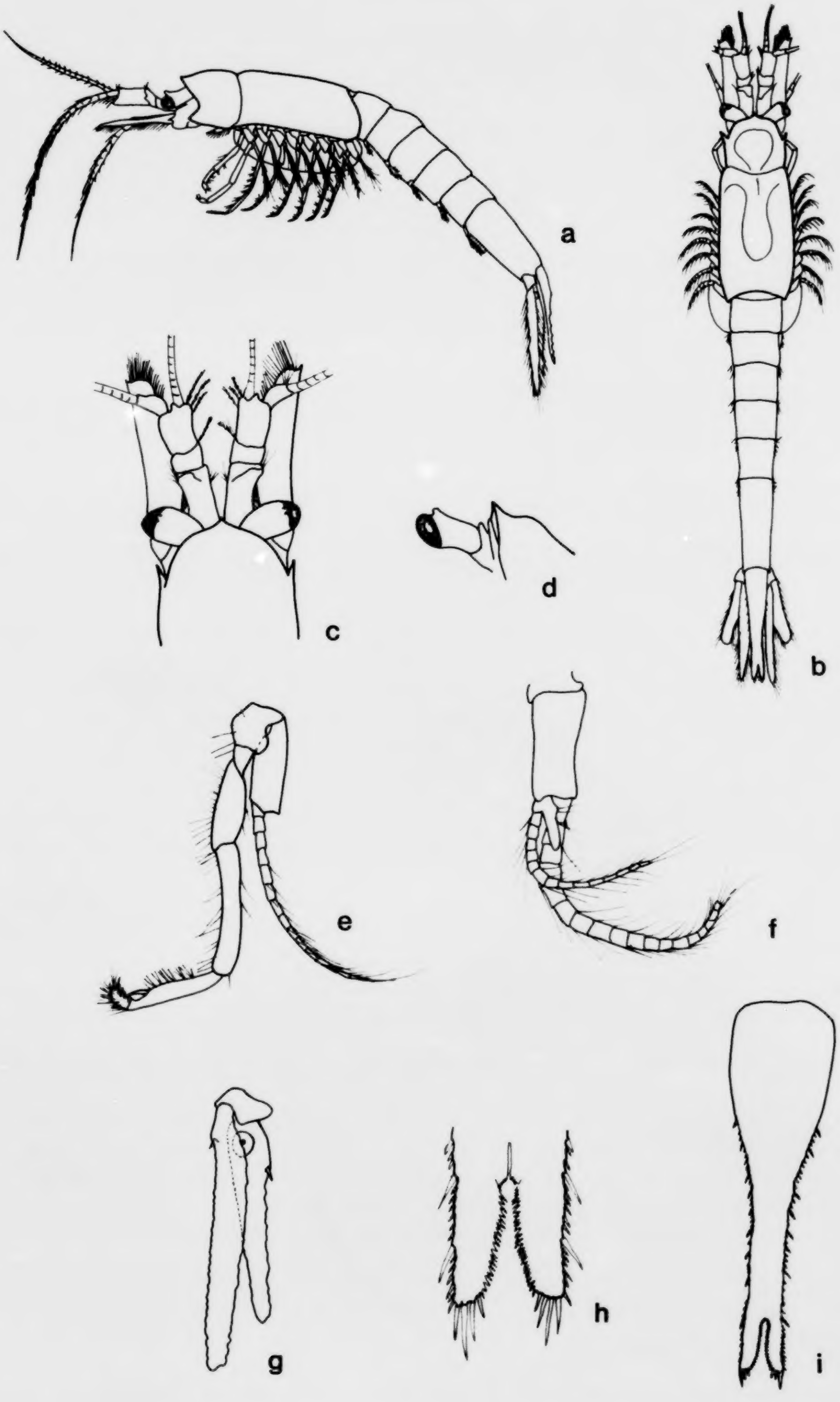
Color. Orange.

TAXONOMIC NOTES Only records from NE Pacific are (1) and (2), but a positive identification is impossible since (1) does not include the characteristic 2nd thoracopod chelation of *B. microps*. Ten specimens from NW Pacific identified as *B. microps* by (3) had 2 spines on the distal corner of the expanded carpus of the 2nd thoracopod, as in *B. bispinosa*. Specimens of (1) could be one of several species.

ECOLOGICAL NOTES May undergo daily migration of 400 m.

DISTRIBUTION Meso- to bathypelagic in Atlantic and mid-Pacific, 80-1500 m (3, 5, 7). Questionably in NE Pacific from Alaska to Washington (1, 2).

Figure. a. lateral view, female (7); b. dorsal view, female (6); c. dorsal view, anterior end (7); d. lateral view, eye (9); e. 2nd thoracopod (7); f. 3rd male pleopod (7); g. uropod (7); h. telson apex, from questionable identify of (1); i. telson (7).



Boreomysis microps

Boreomysis sp. (*rostrata* complex) Illig, 1906

SYNONYMY AND REFERENCES

Boreomysis rostrata Illig, 1906
Birstein and Tchindonova, 1958
Birstein and Tchinodonova, 1962 (1)
Holmquist, 1956 b (2)
Holmquist, 1957b (3)
Ii, 1964
Illig, 1930 (4)
Pearcy et al., 1977 (5)
O. Tattersall, 1955
W. Tattersall, 1951 (6)

Boreomysis inermis Hansen, 1910
Boreomysis jacobi Holmquist, 1956
Birstein and Tchindonova, 1958
Mauchline and Murano, 1977

CHARACTERIZATION (1, 2, 3, 6)

Rostrum. Long and sharply pointed, extending to cornea of eyes. Margins of frontal plate strongly convex; slight shoulders in male, none in female.

Antennal scale. 4X as long as wide. Terminal lobe subequal to length of terminal spine.

Eyes. Moderate sized; stalks stout; large ocular papilla.

Thoracopods. 2nd not subchelate.

Uropods. Exopod has unarmed outer basal portion, terminating with 2 spines. Endopod has 1 long spine at inner margin, distal to statocyst.

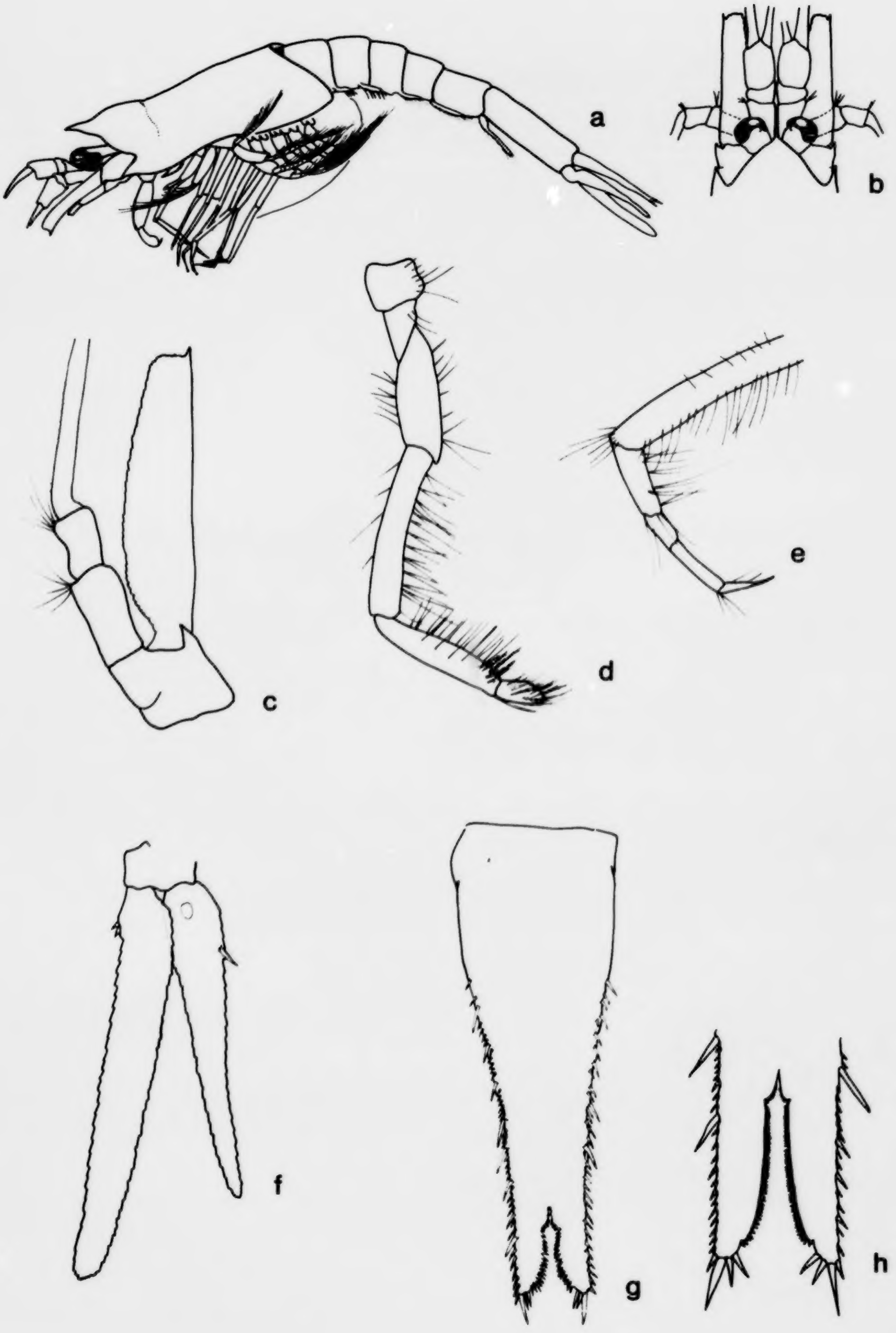
Telson. Much broader basally than distally. 2 size groupings, about 8 large spines on each side with 4-6 small spines between. Cleft about 1/5-1/6 total length; inner part with small slit having dilated margins.

Size. 14-16 mm (2) or to twice as large (1, 4, 6).

TAXONOMIC NOTES Illig's (4) specimens included more than 1 species, and his drawings of the females are probably *B. rostrata*, but the males are not. Holmquist (2) believes the much larger northern specimens are a different species (*B. jacobi*), but her evidence and number of specimens are not convincing, and (I) believe *B. jacobi* should be a race or subspecies. The material considered *B. microps* by Banner (1948a) could be *B. rostrata*, but examination of the specimen is necessary.

DISTRIBUTION Bathypelagic in South Atlantic (between 25° and 55°S), Indian, and Pacific Oceans. In the NE Pacific from Alaska (1) and Oregon (5 and E. Krygier, personal communication).

Figure. a. lateral view, female (2); b. dorsal view, anterior end (6); c. antenna (6); d. 2nd thoracopod (6); e. 3rd thoracopod (2); f. uropod (modified from 6); g. telson (2); h. telson apex (4).



Boreomysis rostrata complex

Caesaromysis Ortmann, 1893

SYNONYMY AND REFERENCES

Caesaromysis Ortmann, 1893 (1)
Banner, 1948a (2)
Banner, 1954b (3)
Banner, 1954d
Birstein and Tchindonova, 1958 (4)
Illig, 1930 (5)
Mauchline, 1980 (6)
Murano, 1977a (7)
O. Tattersall, 1955 (8)
Zimmer 1914 (9)

Caesaromysides Colosi, 1916

W. Tattersall, 1951

CHARACTERIZATION (1, 2, 3, 4, 5, 8, 9)

Carapace. Armed with many long spines. Rostrum long, spiniform, lateral margin with 3 pairs of spines.

Antennal scale. In male small, about ½ length of antennular peduncle, lanceolate, without spinous process but with setae at apex; in female reduced to short conical process.

Eyes. Cornea separated into anterior and posterolateral parts; outgrowth from inner side of eyestalk, small in female but in large males extends almost to distal margin of cornea.

Labrum. Symmetrical.

Thoracopods. Exopod of 1st reduced to small protuberance. 2nd with dactyl articulated to close on concavity in propodus; may act to clean carapace spines. 2nd-8th with propodus divided into two parts by a transverse articulation. 8th with large genital appendage in male.

Oostegites. 3 pairs.

Abdomen. Segments armed with many long spines.

Pleopods. All biramous in male; rudimentary, unsegmented lobes in female.

Uropods. Exopod undivided; its outer margin with setae but no spines; endopod shorter than exopod; statocyst evident.

Telson. Apex rounded, entire, not notched.

TAXONOMIC NOTES Some question whether there is 1 highly variable species or 2 species (2, 3, 6, 7). Strongly dimorphic in many characters (2, 6).

Caesaromysis hispida Ortmann, 1893

SYNONYMY AND REFERENCES

Caesaromysis hispida Ortmann, 1893 (1)
Birstein and Tchindonova, 1962 (2)
Illig, 1930 (3)
Murano, 1977a (4)
O. Tattersall, 1955 (5)
Zimmer, 1914 (6)

Caesaromysis vanclevei Banner, 1948a (7)
Banner, 1954b (8)
Banner, 1954d
Birstein and Tchindonova, 1958
Fulton, 1968

Caesaromysides liguriae Colosi, 1916
W. Tattersall, 1951

CHARACTERIZATION (1, 2, 3, 4, 5, 6, 7)

Carapace. 4-6 pairs of long spines anterior to cervical groove.

Abdomen. In male longer than carapace; in female <½ length of carapace. In male double row of 16-23 spines on segments 1-5, fewer on 6; in female single row of 5-6 spines per segment.

Telson. Terminal pair of plumose setae between pair of terminal spines. In females 1-4 pair of lateral spines, in males up to 8 lateral spines.

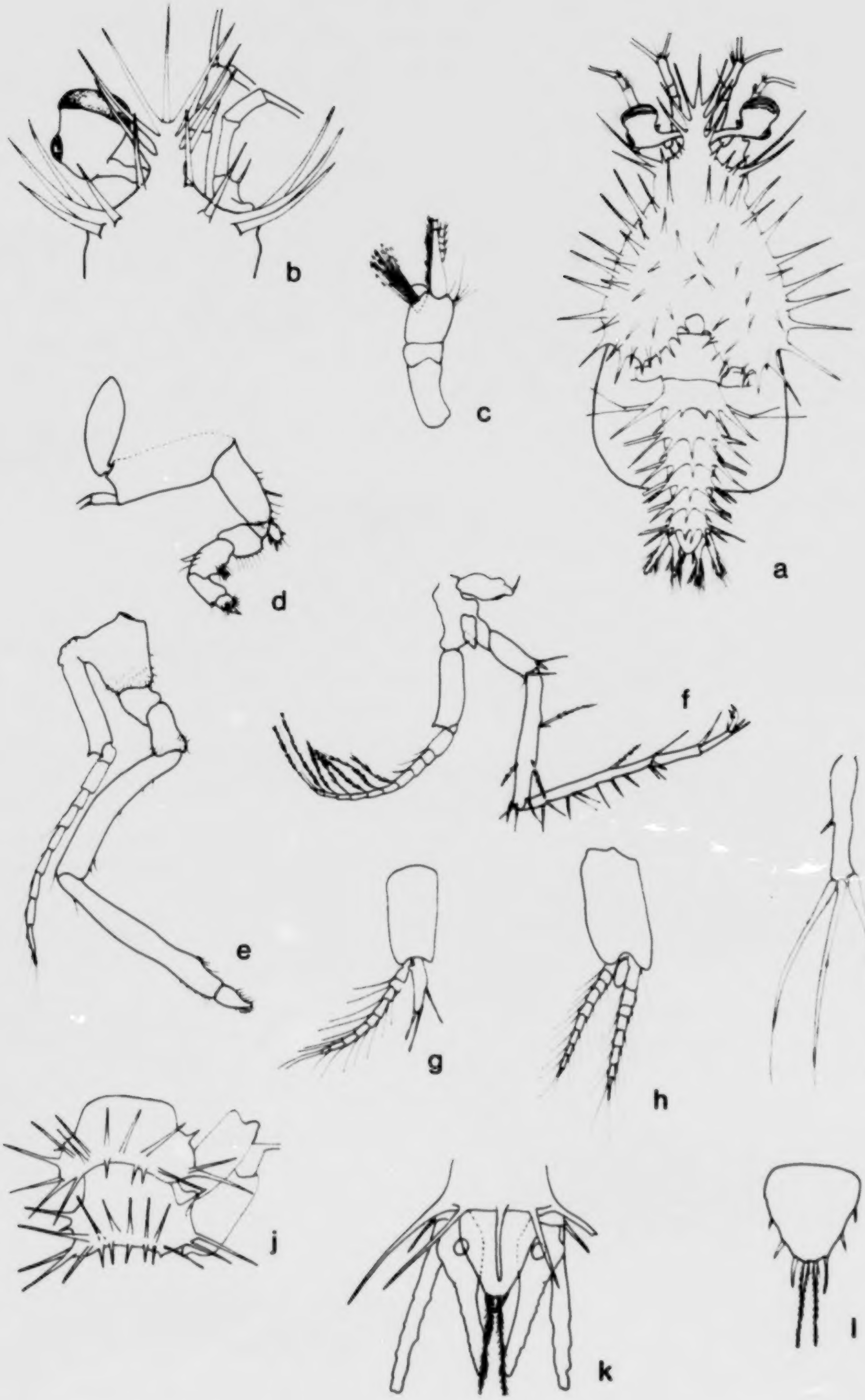
Size. To 10 mm.

Color. Transparent with reddish-brown eyes and touches of red elsewhere.

TAXONOMIC NOTES Differences in spination, antennular peduncle, antennal scale and other characters between equal sized individuals from different populations have not been established as reflecting intraspecies variability (4, 6, 7, 8).

DISTRIBUTION South Atlantic, Indian and South and North Pacific, 50-2000 m (3). NE Pacific from Alaska to central California, 50-1200 m (2, 4, 7, 8).

Figure. a. dorsal view, female (7); b. dorsal view, anterior end, female (4); c. antennular peduncle, male (7); d. 1st thoracopod (7); e. 2nd thoracopod female (7); f. 8th thoracopod, male, from Atlantic specimen (5); g. 1st pleopod, male (7); h. 3rd pleopod, male (7); i. 3rd pleopod, female (7); j. 1st and 2nd abdominal segments, male (7); k. telson and uropods, female (4); l. telson, male (4, modified).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Caesaromysis hispida

Ceratomysis Faxon, 1893

SYNONYMY AND REFERENCES

Ceratomysis Faxon, 1893 (1)

Faxon, 1895 (2)	Illig, 1930 (4)
Hansen, 1910 (3)	Ledoyer, 1977 (5)

CHARACTERIZATION (1, 2, 3, 4, 5)

Carapace. Short, with last two thoracic segments exposed. Dorsal and lateral surfaces with long, stout spines. Rostrum absent.

Eyes. Absent; eye stalk spinelike, no cornea.

Mandibles. With large palp extending beyond antennular peduncle.

Thoracopods. 2nd-3rd relatively short gnathopods; 4th-8th long. 2nd with bladelike endite on ischium subequal to merus.

Gills. Absent.

Marsupium. 7 pairs of oostegites.

Abdomen. Dorsal and lateral surfaces with long, stout spines.

Pleopods. Slender, uniramous in females, increasing in length posteriorly; biramous in males.

Uropods. Statocyst absent.

TAXONOMIC NOTES Three species known, none frequently recorded.

Ceratomysis spinosa Faxon, 1893

SYNONYMY AND REFERENCES

Ceratomysis spinosa Faxon, 1893

Birstein and Tchindonova, 1958 (1)
Faxon, 1895 (2)
Hansen, 1910 (3)
Ledoyer, 1977 (4)
W. Tattersall, 1951 (5)

CHARACTERIZATION (1, 2, 5)

Carapace. Long spine projects obliquely forward on each anterolateral margin.

Antennal scale. Outer edge with 8-10 spines.

Abdomen. Mid-dorsal spine on 1st abdominal segment bifid, and on 2nd single or bifid.

Uropods. Outer edge of exopod with 3-10 spines; no transverse suture on exopod.

Telson. Long, narrow; proximally with 2 large dorsal spines. Apex rounded with a pair of terminal spines separated by single shorter spine.

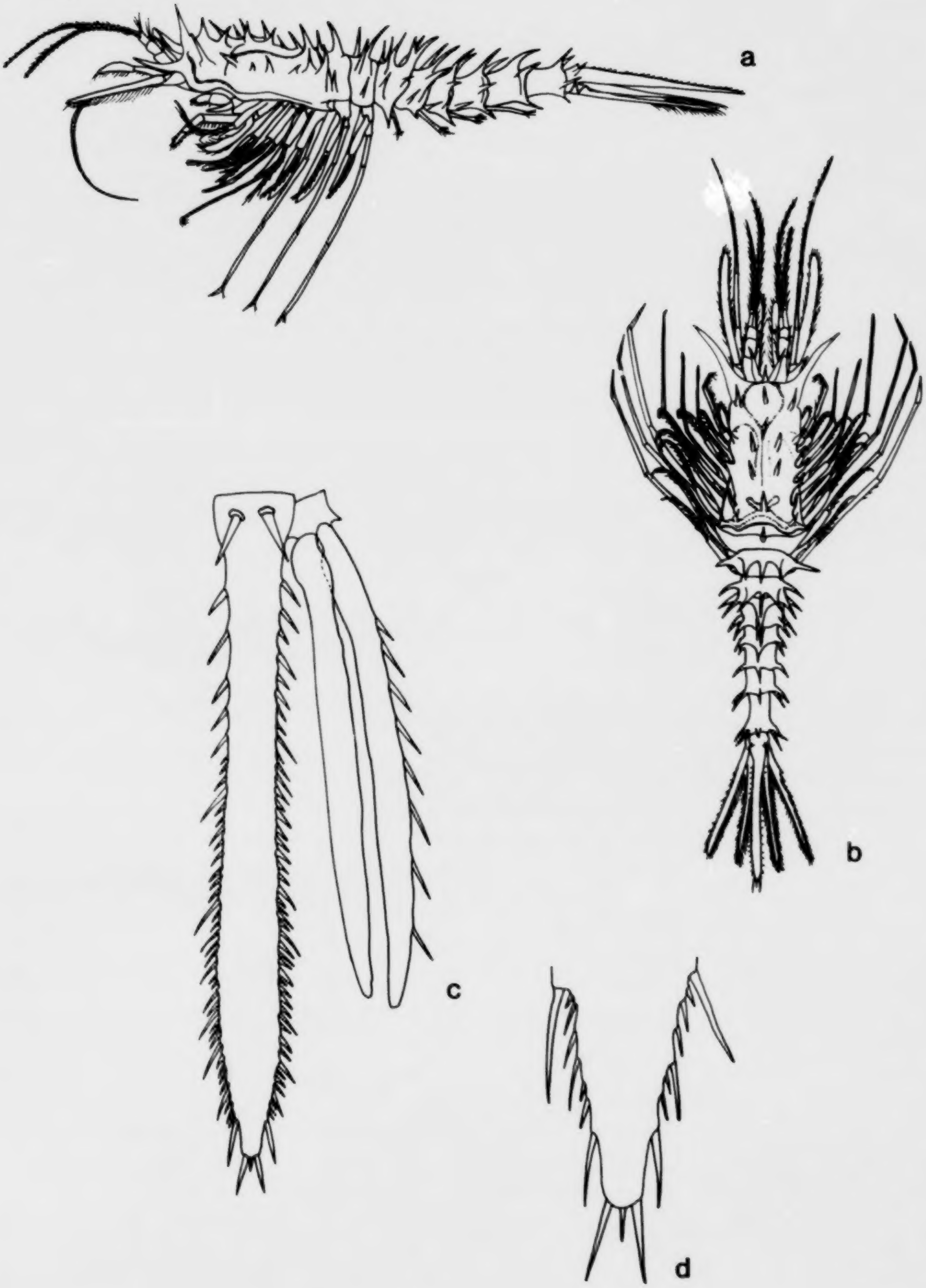
Size. 28-36 mm.

Color. White.

TAXONOMIC NOTES Original description based on single specimen; subsequent descriptions have indicated some variation in form and number of spines on appendages (1, 5).

DISTRIBUTION North Pacific, Bering Sea, Alaska, off Panama, 1050-3400 m (1, 2, 5). Locally, off southern Alaska in 2824 m (5).

Figure. a. lateral view, female (2); b. dorsal view, female (2); c. telson and uropod of 38 mm specimen (1); d. detail of telson tip (1).



Ceratomysis spinosa

Columbiaemysis Holmquist, 1982

SYNONYMY AND REFERENCES

Columbiaemysis Holmquist, 1982 (1)

CHARACTERIZATION (1)

Carapace. Anterolateral corners acute to subacute.

Eyes. Normally developed with single approximately hemispherical cornea; overall length <1.5X mid-stalk width, much shorter than antennal scale.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed anterior.

Thoracopods. 3rd-8th carpo-propodus of endopod few segmented.

Oostegites. 2 pairs, 2 anterior rudimentary pairs; 1 pair hair tufts; no baling lobe.

Abdomen. Smooth or grooved; no spines; no sternal processes.

Pleopods. All rudimentary in females.

Uropods. A few spines on lower inner margin of endopod adjacent to statocyst.

Telson. Narrowly triangular with rounded apex. One size class of lateral spines full length of margins with no increase in size distally. One pair of larger spines at apex with 1 pair of much smaller spines medially. No plumose setae at apex.

Columbiaemysis ignota Holmquist, 1982

SYNONYMY AND REFERENCES

Columbiaemysis ignota Holmquist, 1982 (1)

CHARACTERIZATION (1, herein)

Carapace. Smooth; rostrum with straight sides forming an acute angle at the pointed apex.

Antennules. Male peduncle stouter than female; well developed appendix masculinus.

Antennal scale. Length 7-8 times width.

Thoracopods. 3rd-8th with carpo-propodus endopod 5-6 segmented (excluding dactyl).

Abdomen. May vary from smooth to grooved; in some specimens 1st and 6th segments have 3 folds, 2nd-5th have 2; in others single groove is visible on 3rd and 4th only; no spines or projections.

Pleopods. In males, all uniramous with 10-16 long setae, except 4th; 5th longer than others. 4th reaches to middle of telson; endopod ¼ as long as exopod, distal segment 2/3 as long as proximal.

Oostegites. 2 pairs.

Uropod. 4-5 spines on inner lower margin adjacent to statocyst.

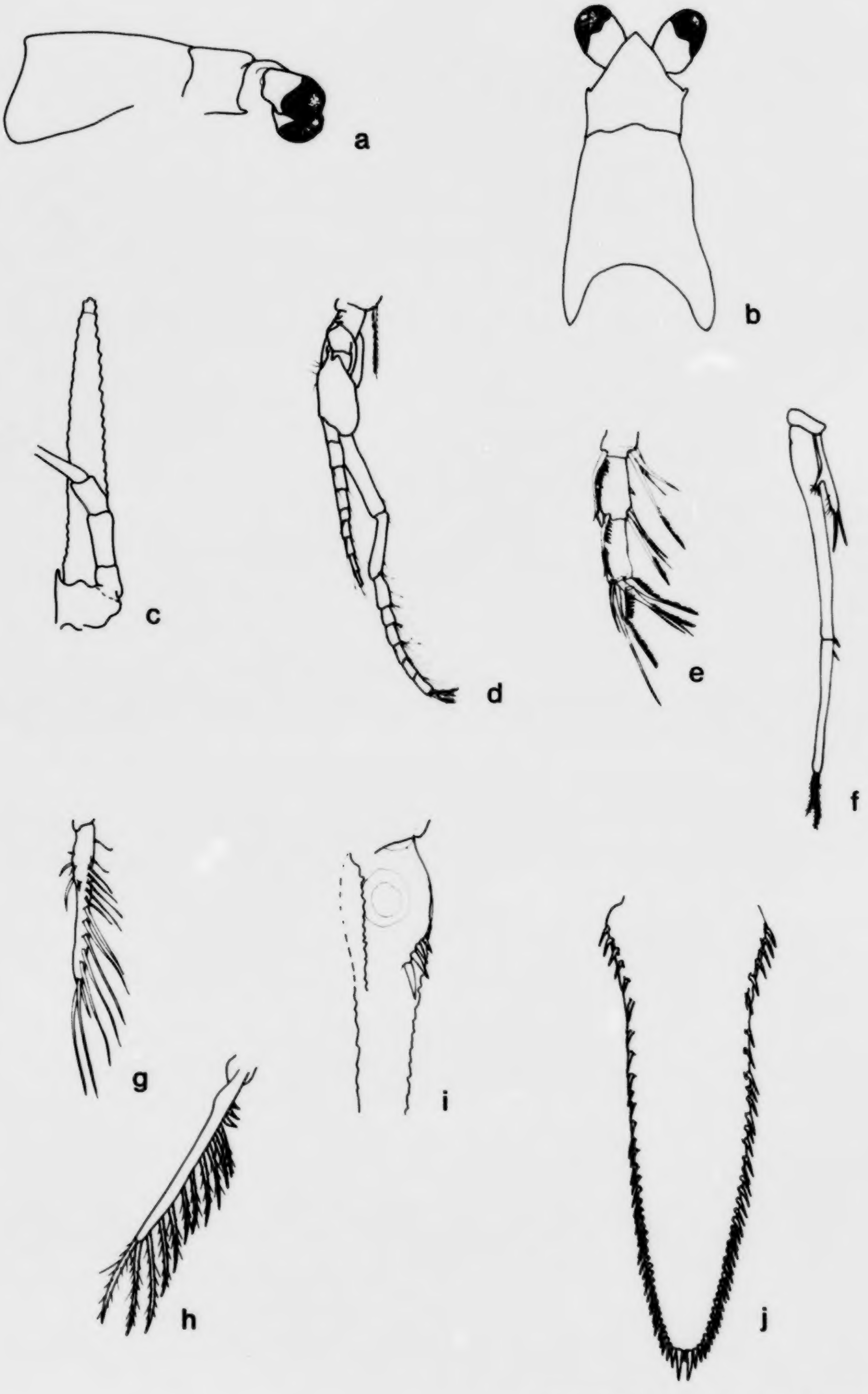
Telson. Length 3 times width; 40-46 spines on each margin.

Size. 14-18 mm.

TAXONOMIC NOTES Original description including erection of a new genus based on females only. Twelve specimens, including males, collected by P.N. Slattery and others from near Bird Island, Pachena Bay, B.C. at 9 m on 22 July 1983. These are all larger than original size range. The original description stated that abdomen was smooth but re-examination of one of the two original adult specimens shows clear although incomplete grooves on some abdominal segments. All other described characters for the females fit the one female specimen in the present material. Some males noted here will be deposited in the National Museum of Canada and the U.S. National Museum.

DISTRIBUTION British Columbia, littoral and shallow sublittoral.

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. antenna (1); d. 8th thoracopod (1); e. 8th thoracopod end, showing comb setae (1); f. 4th male pleopod (orig.); g. 5th female pleopod (1); h. 5th male pleopod (orig.); i. endopod of uropod (1); j. telson (1).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Columbiaemysis ignota

Disacanthomysis Holmquist, 1981

SYNONYMY AND REFERENCES

Disacanthomysis Holmquist, 1981b (1)

Acanthomysis

CHARACTERIZATION (1)

Carapace. Anterolateral margins pointed. Rostrum short and triangular.

Eyes. Normally developed with single approximately reniform cornea. Overall length _1½X mid-stalk width, much shorter than antennal scale. Stalk with dorsal papilla.

Antennules. No knoblike processes in male.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Long acute frontal process.

Thoracopods. 3rd-8th carpo-propodus of endopod several segmented.

Oostegites. 2 pairs ordinary, 1st with baling lobes; 3 anterior rudimentary pairs; no hair tufts.

Abdomen. Smooth, no spines.

Pleopods. All rudimentary in females, and all but 4th and 5th rudimentary in males, only unjointed plates; 4th with endopod _½ length of exopod; 2 terminal barbed setae, length from 1½ to 3X that of adjacent segment; 5th uniramous, as long as 4th, with 2 segments, terminating in single long barbed seta.

Uropods. Many spines on lower inner margin of endopod adjacent to statocyst.

Telson. Linguiform; length 2½X width; no increase in size from base to apex; rounded apex. Spines full length of margins with tendency to size grouping distally. Apex with 1 pair large spines and 1 pair small spines between; no plumose setae.

TAXONOMIC NOTES Only 1 species known at present.

Disacanthomysis dybowskii (Derzhavin, 1913)

SYNONYMY AND REFERENCES

Orientomysis dybowskii Derzhavin, 1913 (1)

Neomysis dybowskii by W. Tattersall, 1932

Acanthomysis dybowskii by Ii, 1936 (2)
Banner, 1948b Ii, 1964 (3) W. Tattersall, 1951 (4)

Disacanthomysis dybowskii by Holmquist, 1981b (5)

CHARACTERIZATION (1, 2, 3, 4, 5)

Antennal scale. Length 8 times width.

Thoracopods. 3rd-8th carpo-propodus of endopod 5-7 segmented. Merus with 3-10 long setae in each of 5-6 groups, forming comb rows.

Uropods. About 13 spines on inner, lower margin adjacent to statocyst.

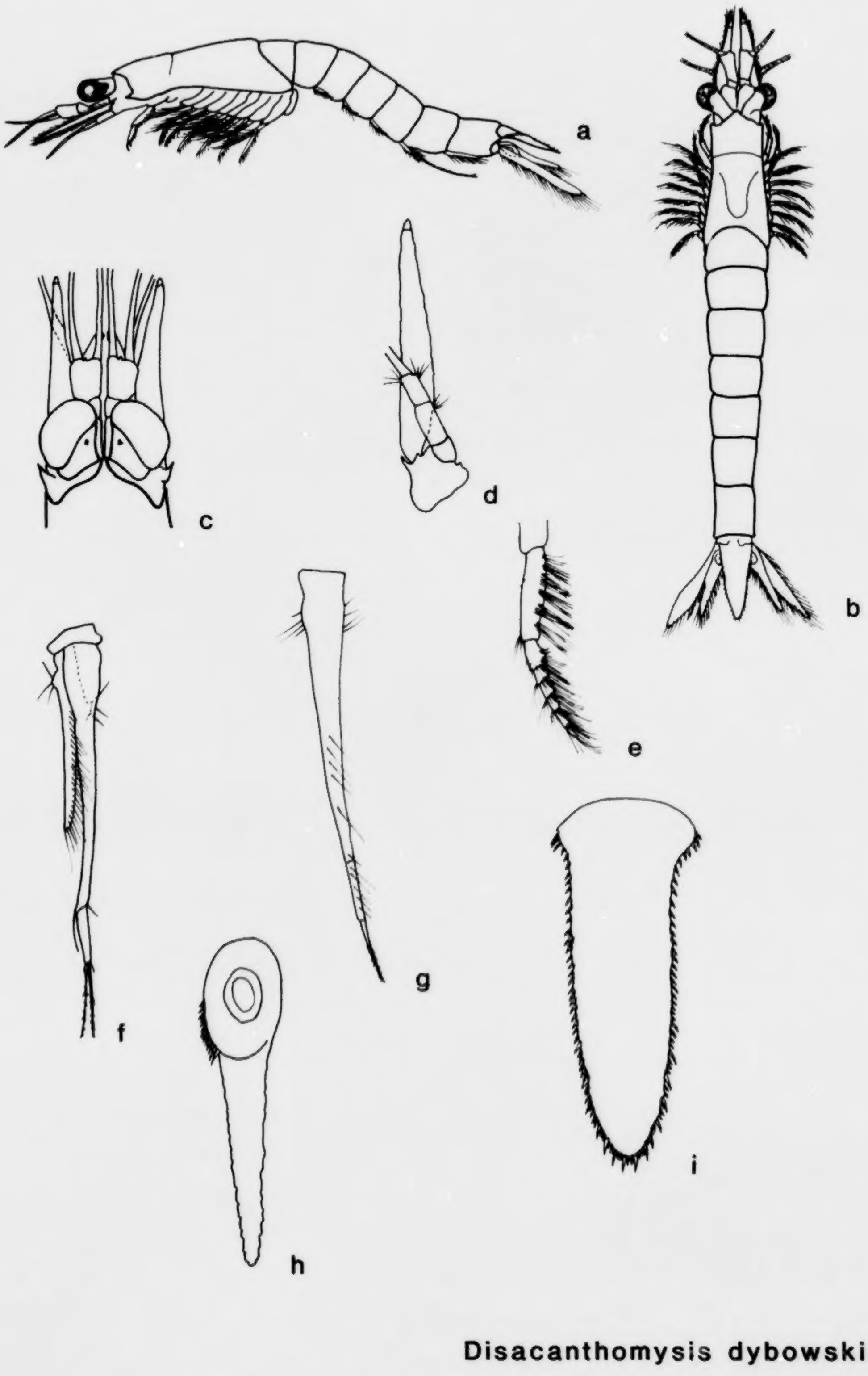
Telson. On distal ½ the large spines are separated by 2-6 small spines.

Size. To 25 mm.

TAXONOMIC NOTES The "large" spines on the telson are less than ½ the size of those in other NE Pacific species in the old "Acanthomysis" complex.

DISTRIBUTION North Pacific, Bering Sea, east and south to Washington; shallow, coastal waters to 40 m (3, 4, 5).

Figure. a. lateral view, male (3); b. dorsal view (1); c. dorsal view, anterior end (3); d. antenna (4); e. distal part of 7th or 8th thoracopod (3); f. 4th male pleopod (4); g. 5th male pleopod (4); h. endopod of uropod (3); i. telson (4).



Disacanthomysis dybowskii

Euchaetomera G.O. Sars, 1883

SYNONYMY AND REFERENCES

Euchaetomera G.O. Sars, 1883

Ii, 1964 (1)	Murano, 1977a (3)
Mauchline, 1980 (2)	Tattersall and Tattersall, 1951 (4)

CHARACTERIZATION (1, 2, 3, 4)

Carapace. If spinous, restricted to anterior or lateral areas. Short, leaving nearly all of last thoracic somite exposed dorsally. Rostrum small, rounded or pointed.

Antennal scale. Outer margin not setose, terminating in distinct spine; distal suture.

Eyes. Large, with retina divided into anterior and posterolateral parts.

Mandibles. Normal cutting lobe, and well developed palp.

Labrum. Normal shape, rounded behind; symmetrical; no frontal process.

Thoracopods. 2nd with short dactyl, a gnathopod; 3rd-8th with propodus separated from carpus by oblique articulation; propodus 2 segmented.

Oostegites. 2 pairs.

Abdomen. No pleura.

Pleopods. Rudimentary in females; in males 1st rudimentary or endopod reduced, 2nd-5th biramous, natatory.

Uropods. With large statocyst.

Telson. Short, triangular, apex truncate with a pair of plumose setae and 1 or 2 pairs of spines; lateral margin with or without spines.

TAXONOMIC NOTES Murano (3) provides a key to the nine known species.

Euchaetomera tenuis G.O. Sars, 1883

SYNONYMY AND REFERENCES

Euchaetomera tenuis G.O. Sars, 1883

Banner, 1948a (1)	Ii, 1964 (3)	Tattersall and Tattersall, 1951 (7)
Banner, 1954d	Illig, 1930 (4)	O. Tattersall, 1955 (8)
Hansen, 1910 (2)	Murano, 1977a (5)	
	G.O. Sars, 1885a (6)	

Euchaetomera fowleri Holt and Tattersall, 1905a (9)
Zimmer, 1909

CHARACTERIZATION (1, 2, 3, 4, 5, 6, 7, 9)

Carapace. No spines on anterior margin; anterolateral corners rounded. Rostrum a small projection, sometimes upturned at tip.

Antennae. Scale length 5-7 times width; peduncle extends to 3/4 the length of scale.

Eyes. Outer margin of eye parallel to inner one; posterior pigmented retina much smaller than anterior one; distance between anterior and posterior retinas at outer margin almost equal to length of posterior outer margin; long process projects forward from inner margin in males, but is small or absent in females. Color brownish red.

Thoracopods. Some with fingerlike epipod with 4 setae.

Uropods. Exopod long and narrow.

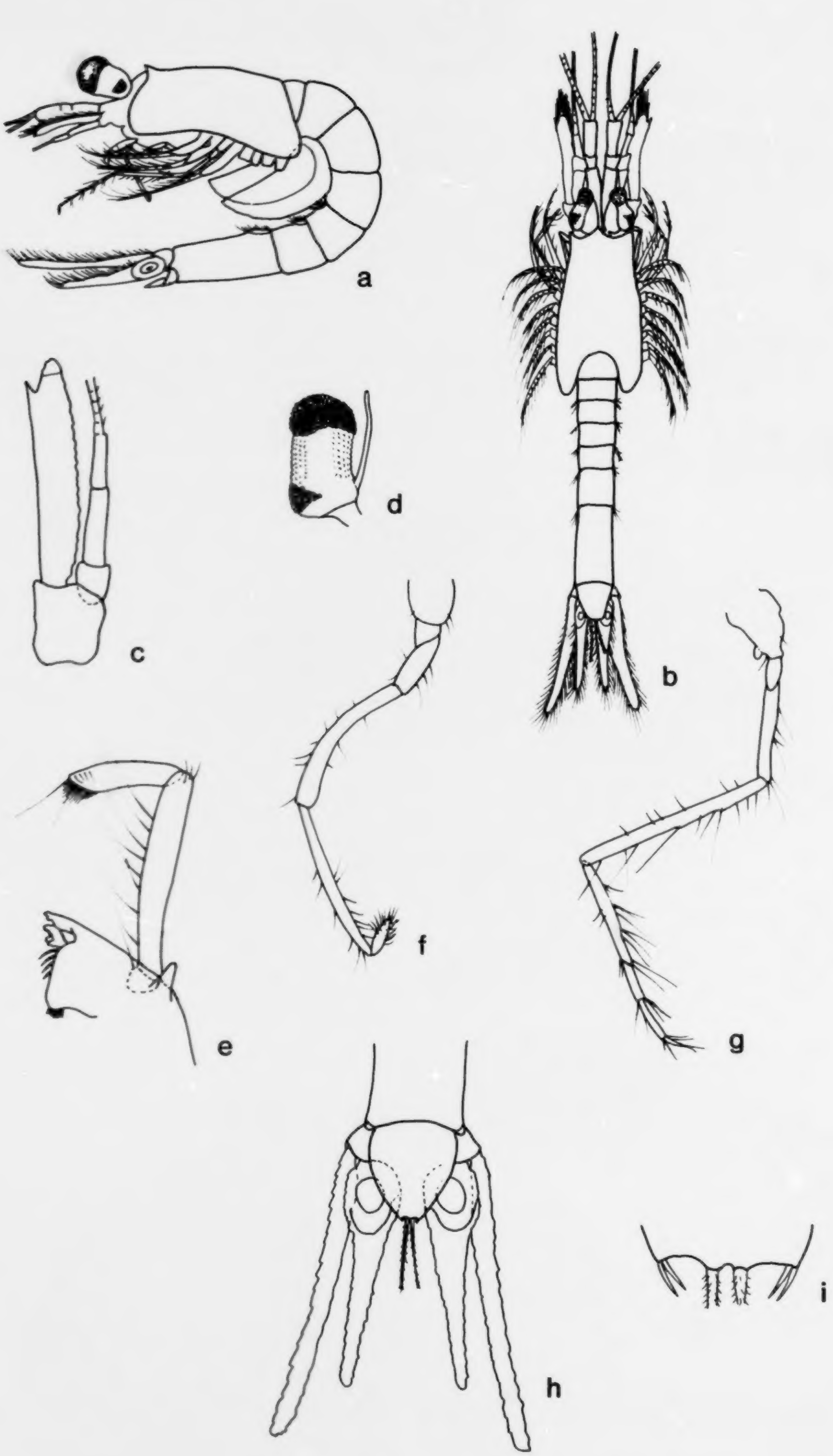
Telson. No spines on lateral margins; 2 closely set spines at each side of apex; median setae long and densely plumose.

Size. To 11 mm.

TAXONOMIC NOTES Contiguous anterior and posterior retinas shown by (6) is an error; his figure of the telson also lacks the small but characteristic double spines (2).

DISTRIBUTION Oceanic mesopelagic in Atlantic, Pacific and Indian Oceans, rarely at surface, 200-5000 m (3, 5, 7, 8). NE Pacific from British Columbia (1).

Figure. a. lateral view, female (3); b. dorsal view, female (6, 7); c. antenna (7); d. dorsal view, eye, male (7); e. mandible and palp (3); f. 2nd thoracopod (3); g. 3rd thoracopod (3); h. uropods and telson (7); i. apex of telson (7).



Euchaetomera tenuis

Euchaetomeropsis Tattersall, 1909

SYNONYMY AND REFERENCES

Euchaetomeropsis Tattersall, 1909

Banner, 1948a (1)	Murano, 1977a (3)
Mauchline, 1980 (2)	W. Tattersall, 1909 (4)

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Fully covering thoracic segments. Rostrum small, rounded or pointed.

Antennal scale. No tooth on distal outer margin; setose all around; articulated rounded tip.

Eyes. Large, with retina divided into anterior and posterolateral parts.

Mandibles. Normal cutting lobe, and well developed palp.

Labrum. Normal shape, rounded behind, symmetrical, no forward process.

Thoracopods. 2nd with short dactyl, a gnathopod; 3rd-8th with propodus separated from carpus by oblique articulation; propod two segmented.

Oostegites. 2 pairs.

Abdomen. No pleura.

Pleopods. Rudimentary in females; in males 1st rudimentary or endopod reduced; 2nd-5th biramous, natatory.

Uropods. With large statocyst.

Telson. Short, triangular; apex tuncate with a medial pair of plumose setae and with one spine at each corner.

TAXONOMIC NOTES Murano (3) provides a key to the two known species. This genus is similar to Euchaetomera, but differs in the antennal scale.

Euchaetomeropsis pacifica Banner, 1948

SYNONYMY AND REFERENCES

Euchaetomeropsis pacifica Banner, 1948a (1)

Banner, 1954d	Murano, 1977a (2)
	? W. Tattersall, 1943 (3)

CHARACTERIZATION (1, 2)

Carapace. Deep posterior emargination is ¼ carapace length.

Rostrum. Short, rounded projection.

Antennules. 1st and 3rd segments of peduncle elongate, of equal length.

Antennal scale. Length 5 times width; small articulation distally; 7-8 setae on outer margin, 11-12 setae on inner margin, 4 setae on tip.

Eyes. Posterior pigmented retina about ½ diameter of anterior one; short ocular process about 1/5 length of eye on ventral surface of peduncle.

Mandibles. No setae on rounded molar process.

Maxillae. Length of 2nd article of endopod 3X as long as width; subequal to exopod.

Abdomen. Only slightly longer than cephalothorax.

Uropods. Exopod long and narrow; no statocyst spines.

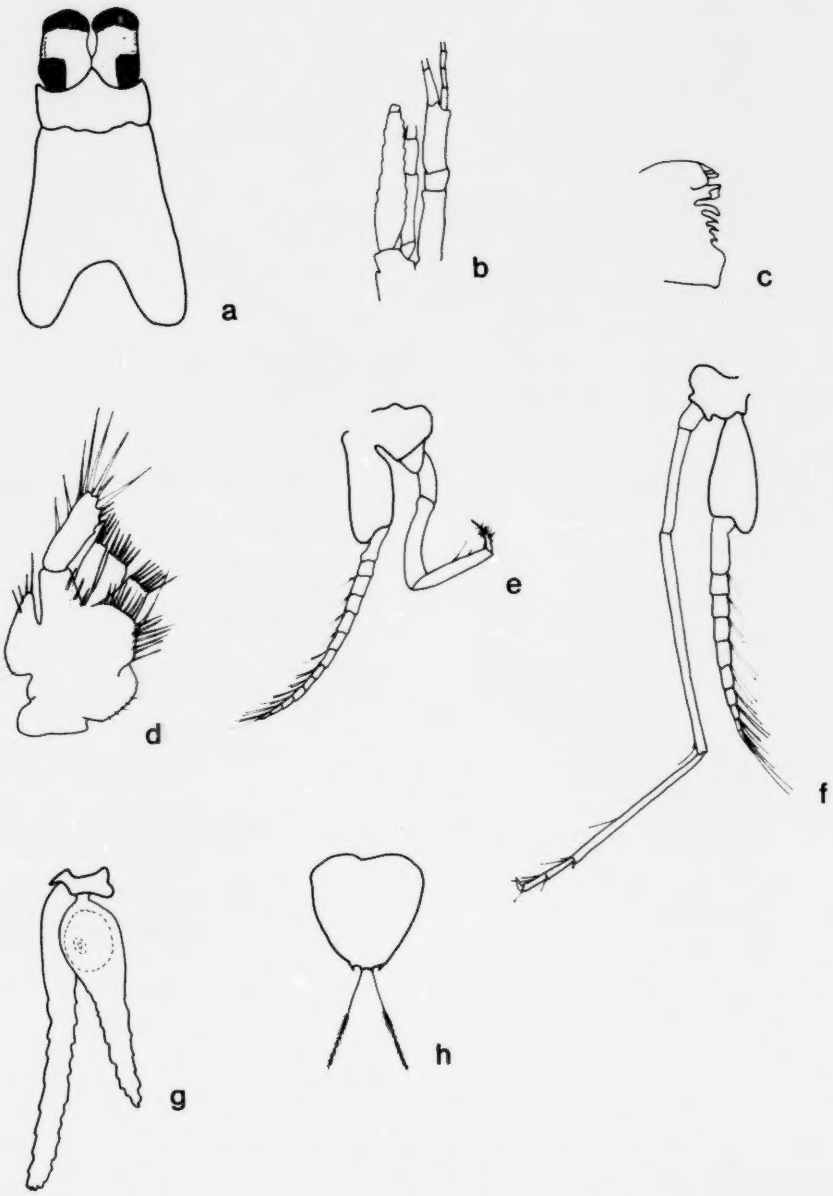
Size. 4-6 mm.

Color. No data.

TAXONOMIC NOTES Description based on only 2 individuals, no subsequent published records, although report by (3) of E. merolepis off central California, the only known species at that time, may refer to E. pacifica.

DISTRIBUTION Published records limited to off the Queen Charlotte Islands, 100-900 m.

Figure. a. dorsal view, carapace and eyes (1); b. antennule and antenna (1); c. mandibles (1); d. maxilla (1); e. 2nd thoracopod (1); f. 8th thoracopod (1); g. uropod (1); telson (1).



Euchaetomeropsis pacifica

Eucopia Dana, 1852

SYNONYMY AND REFERENCES

Eucopia Dana, 1852 (1)
Banner, 1954b (2)
Banner, 1954d
Birstein and Tchindonova, 1958 (3)
Fage, 1942 (4)
Hansen, 1905a (5)
Hansen, 1910 (6)
Mauchline, 1980 (7)
Nouvel, 1943 (8)
G.O. Sars, 1885a (9)
Tattersall and Tattersall, 1951 (10)
O. Tattersall, 1955 (11)
Waterman et al., 1939 (12)

Chalaraspis Willemoes-Suhm, 1875

CHARACTERIZATION (6, 7, 8, 9, 10, 11)

Antennae. Scale smooth, no lateral spines, with transverse suture distally.

Mandibles. Asymmetrical, left smaller, hollowed out; with lacinia mobilis on left side only.

Maxillules. Without palp.

Thoracopods. 2nd-4th relatively short subchelate endopods; 5th-7th very long, slender subchelate endopods; 8th relatively short, non-chelate.

Gills. Well developed on 2nd-7th thoracopods under carapace; larger in males.

Oostegites. 7 pairs.

Abdomen. No pleural plates.

Pleopods. Well developed biramous, in both males and females; larger in males.

Uropods. Exopod divided by transverse suture near apex; no statocyst.

Telson. Entire, no apical crescent or groove.

TAXONOMIC NOTES Taxa have been split and combined within this genus several times (2, 3, 4, 5, 6, 9, 10, 11). Much of the confusion may relate to the considerable changes during growth. The type-species has been lost and the original description is insufficient to establish which of several species was in hand (1, 9). Eucopia are very fragile, making it difficult to obtain well-preserved specimens (11). From 1 to 4 species have been identified from the NE Pacific. Problems in synonymies, descriptions, lack of well-preserved specimens, and disagreements among authors indicate that this genus is badly in need of revision. For a more detailed account of the problems see, for example, (2, 3, 6, 8, 10 and 11).

ECOLOGICAL NOTES All are deep water forms, perhaps spending time on the bottom; some species may undergo diurnal migrations of 400 meters; generally regarded as raptorial feeders (9, 10, 12).

Eucopia australis Dana, 1852

SYNONYMY AND REFERENCES

Eucopia australis Dana, 1852
Banner, 1954b (1)
Banner, 1954d
Birstein and Tchindonova, 1958 (2)
Hansen, 1910 (3)
Fage, 1942 (4)
Nouvel, 1943 (5)
Ortmann, 1907 (6)
G.O. Sars, 1885a in part (7)
W. Tattersall, 1951 (8)
O. Tattersall, 1955 (9)

Eucopia major Hansen, 1910
Nouvel, 1943
W. Tattersall, 1951 (8)

Eucopia unguiculata
Banner, 1954b

Non *Eucopia australis* of Banner, 1954b (10)

CHARACTERIZATION (3, 4, 5, 9)

Carapace. Anterior margin strongly convex, extends anteriorly well beyond lateral carapace projections.

Antennules. Inner margin of 3rd segment of peduncle distinctly concave, lobes on distal margin approximately equal.

Antennal scale. Markedly sinuous in males, straight in females. Suture at approximately same level as distal end of peduncle.

Eyes. Cornea and stalk in straight line.

Thoracopods. 4th stronger and more robust than 2nd and 3rd.

Telson. Penultimate large spine separated from terminal large spine by small spines which increase in size toward terminal spine.

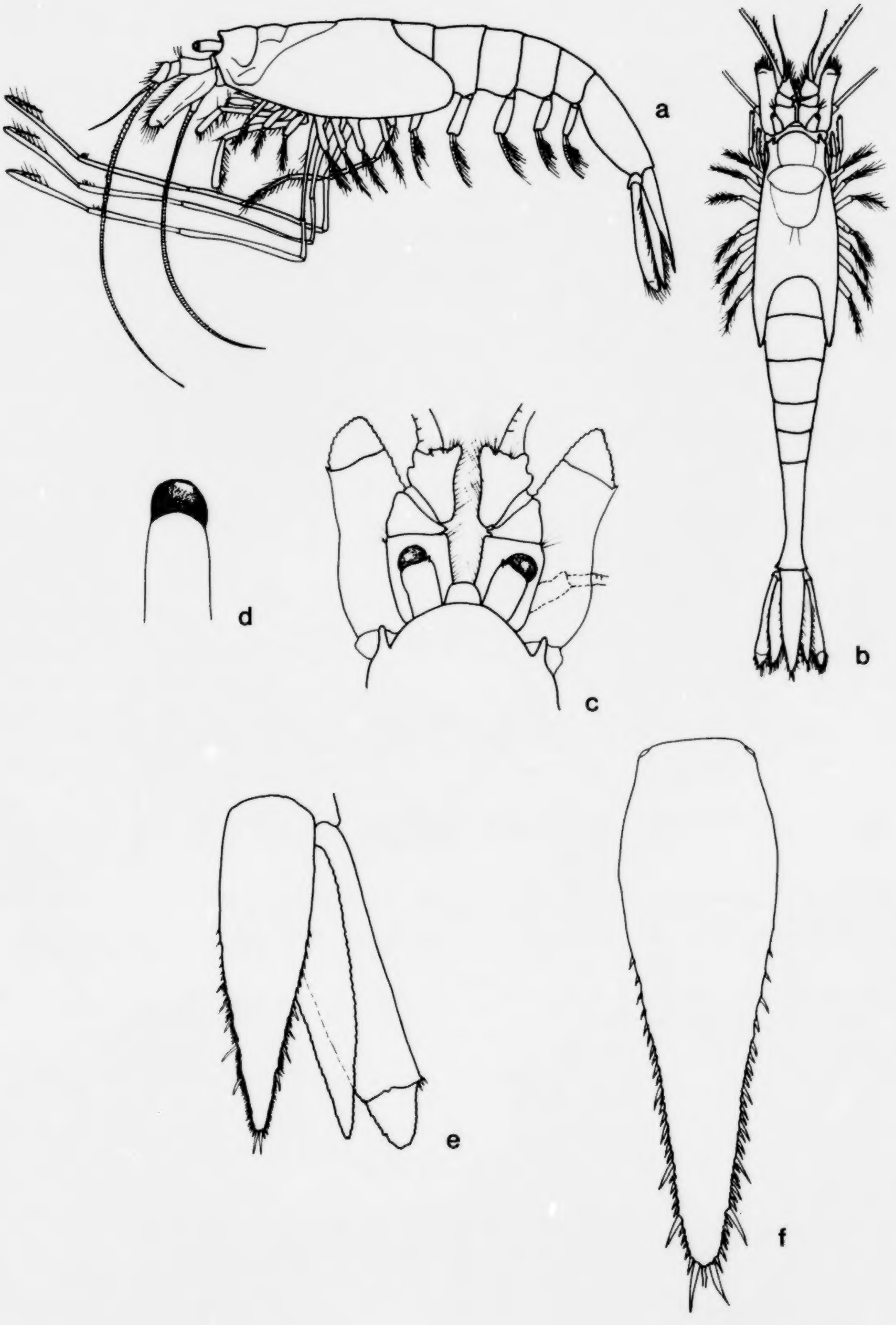
Size. Mature individuals 45 to 70 mm.

Color. Purple pink to brilliant scarlet.

TAXONOMIC NOTES Published records from NE Pacific need to be reassessed. Sars' (6) drawings may include three species. Krygier (personal communication) believes the only valid species for this area are *E. australis* and *E. sculpticauda*. O. Tattersall (9) believes Dana's original description is probably that of *E. unguiculata*, in which case *E. unguiculata* should assume the name *E. australis*, and *E. australis* should be given a new specific designation.

DISTRIBUTION All seas except Arctic, 600-6000 m (1, 8); possible records from Bering Sea and southern California (6, 7, 8, 9, 10). Locally, from Oregon coast (E. Krygier, personal communication).

Figure. a. lateral view, young female, general form as *E. australis* but may be *E. grimaldii* (7); b. dorsal view, adult female, as in a. (7); c. dorsal view, anterior end (9); d. eye (9); e. telson and uropods (9); f. telson (5).



Eucopia australis

Genus *Eucopia sculpticauda* Faxon, 1893

SYNONYMY AND REFERENCES

Eucopia australis (part) G.O. Sars, 1885a (1)

Eucopia sculpticauda Faxon, 1893
Banner, 1954b (2)
Fage, 1942 (3)
Faxon, 1895 (4)
Hansen, 1905a (5)
Hansen, 1910 (6)
Illig, 1930 (7)
Nouvel, 1943 (8)
Nouvel, 1950 (9)
O. Tattersall, 1955 (10)
Tattersall and Tattersall, 1951 (11)
Zimmer, 1909 (12)

Eucopia intermedia Hansen, 1905a (5)

CHARACTERIZATION (3, 4, 7, 8, 9, 10, 11, 12)

Carapace. Anterior margin forming elongate, obtuse triangle.

Antennules. Inner margin of 3rd segment of peduncle approximately straight; inner lobe on distal margin approximately 2X length of outer lobe.

Antennal scale. Outer margin convex, not sinuous; no spine at distal outer margin. Suture at approximately same level as distal end of peduncle.

Eyes. Stalk distinctly inflated distally. Color dark red, almost black, in adults; yellow in juveniles.

Thoracopods. 4th stronger and more robust than 2nd and 3rd; all more robust than in other described species.

Branchiae. Small pair in front of 8th thoracopods, not behind or lateral as in preceding pairs. This character is unique to this species in the genus.

Telson. One or two lateral constrictions near apex; apex narrowly rounded, no larger terminal spines; no terminal pair of setae; dorsal surface ornamented with honeycomb ridges.

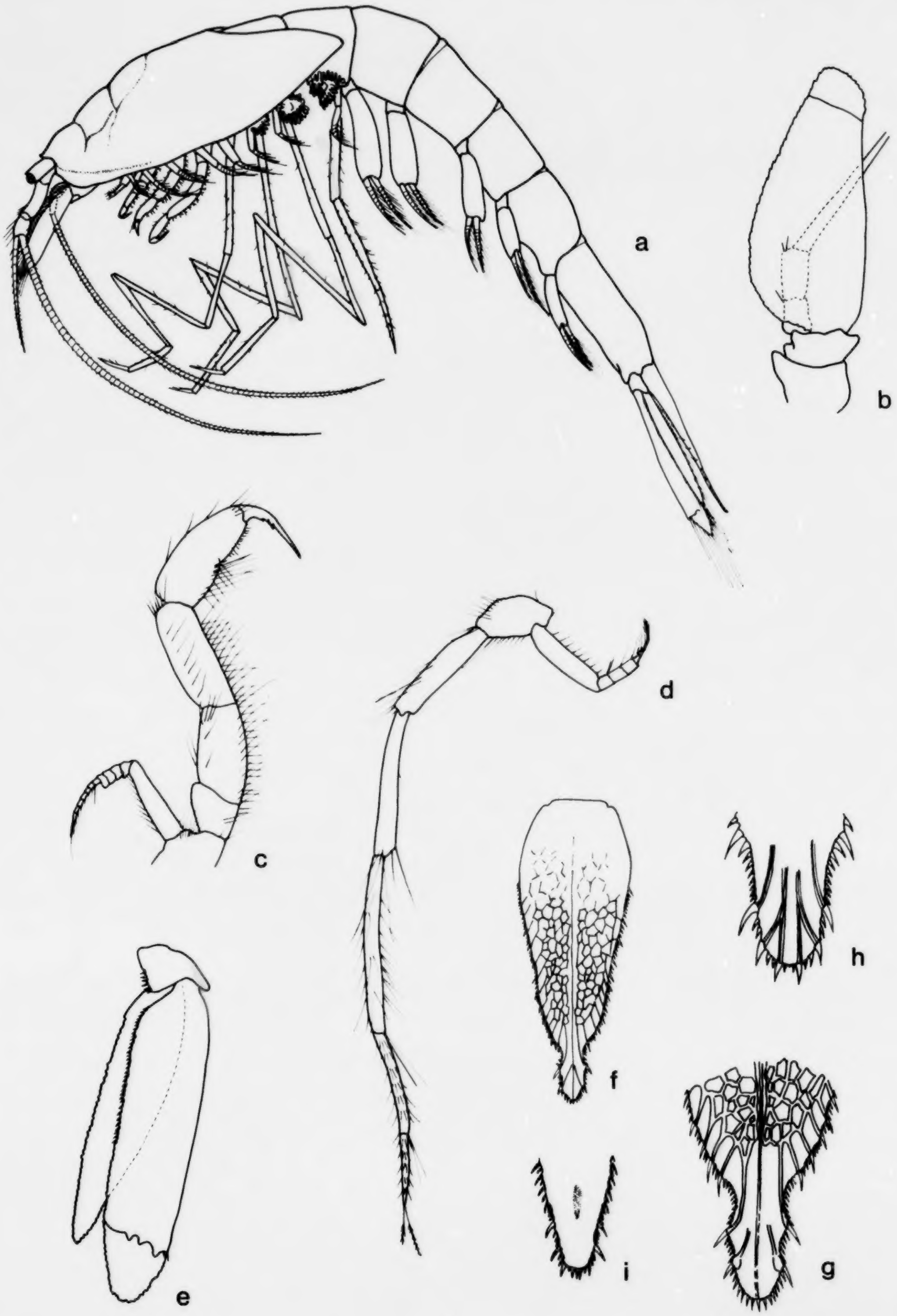
Size. To 66 mm.

Color. Dark purple red to brilliant coral red (2, 4, 10).

TAXONOMIC NOTES Juveniles lack the characteristic sculpturing and constriction on the telson; see (7) for good drawings and discussion of changes. Hansen (5) noted that a "Challenger" specimen labeled "type" for *E. australis* by (1) was in fact *E. sculpticauda*; (1) also draws *E. sculpticauda* (10).

DISTRIBUTION Warm temperate and tropical waters in all oceans; rarely cold temperate; bathypelagic from 600->2500 m (10); NE Pacific from southern California (2) and Oregon (Krygier, personal communication).

Figure. a. lateral view, male (11); b. antenna (11); c. 3rd thoracopod (11); d. 8th thoracopod (11); e. uropod (11); f. telson (11); g. telson apex (11); h. telson of 39 mm female (7); i. telson of 18 mm male (7).



Eucopia sculpticauda

Eucopia grimaldii Nouvel, 1942

SYNONYMY AND REFERENCES

Eucopia grimaldii Nouvel, 1942a (1)
Birstein and Tchindonova, 1958 (2)
Birstein and Tchindonova, 1962 (3)
Fage, 1942 (4)
Nouvel, 1943 (5)
O. Tattersall, 1955 (6)
Tattersall and Tattersall, 1951 (7)

Eucopia unguiculata
Banner, 1948a (8)
Hansen, 1905b in part?
Ortmann, 1907 in part?
W. Tattersall, 1951 in part (9)

Eucopia australis
G.O. Sars, 1885a in part?

CHARACTERIZATION (2, 4, 5, 6, 7)

Carapace. Anterior margin weakly convex, extends anteriorly only slightly beyond lateral carapace projections.

Antennules. Inner margin of 3rd segment of peduncle approximately straight. Inner lobe on distal margin considerably longer than other lobes resulting in the overall angle formed by the inner and distal margins being more acute than in E. unguiculata.

Eyes. Proximal margin of cornea approximately bisects a right angle to the long axis of stalk.

Uropods. Length of distal segment of exopod subequal to width at articulation.

Telson. 6th abdominal segment slightly (ca. 1.1 times) longer than telson; penultimate large spine on each side separated from terminal large spine by 2-4, rarely up to 8, small spines of equal size.

Size. Mature females from 27 to 40 mm.

TAXONOMIC NOTES Banner (8) identified material from Alaska to Washington as E. unguiculata, which (2) consider E. grimaldii because (8) had not yet seen this description. Banner's illustration of a few small spines adjacent to the apex of the telson conforms only to E. grimaldii, but he states that the apex is narrowly truncate (vs. rounded); a feature which might be interpreted either way in a given specimen. The outer margin is illustrated as straight on one antennal scale but sinuate on the other. The illustrated form of the 3rd segment of the antennal peduncle is more similar to E. unguiculata than to E. grimaldii. The symmetrical apex of the antennal scale corresponds to that described for E. unguiculata. We have re-examined some material from British Columbia (USNM 89737) identified as E. unguiculata by (9). These specimens fit the above characterization of E. grimaldii except that the antennal scale apex appears symmetrical in some specimens. The anterior margin of the carapace in this material is less convex than illustrated in (5) but similar to that in (6).

ECOLOGICAL NOTES Reported to be adapted to lower temperatures than *E. unguiculata* (2, 4).

DISTRIBUTION Bathypelagic from 500-2500 m in tropic to low arctic waters (2, 3, 4, 6, 7); in North Pacific recorded from Japan north to the Bering Sea and south to Washington; distribution south of Washington needs to be reassessed (2, 8, 9, herein).

Figure. See *E. unguiculata*.

Eucopia unguiculata (Willemoes-Suhm, 1875)

SYNONYMY AND REFERENCES

Chalaraspis unguiculata Willemoes-Suhm, 1875

Eucopia unguiculata
Banner, 1948a (1)
Banner, 1954b (2)
Banner, 1954d
Hansen, 1905 (3)
Ortmann, 1906 (4)
W. Tattersall, 1951 (5)
Tattersall and Tattersall, 1951 (in part) (6)
O. Tattersall, 1955 (7)

Eucopia hanseni Nouvel, 1942
Fage, 1942 (8)
Nouvel, 1943 (9)

Eucopia australis non Dana, 1852
Sars, 1885a (in part)
Banner, 1954 (in part) (10)

Eucopia grimaldii non Nouvel, 1942a
Birstein and Tchindonova, 1958 (in part) (11)

CHARACTERIZATION (3, 6, 7, 8, 9)

Carapace. Anterior margin weakly convex, extends anteriorly only slightly beyond lateral carapace projections.

Antennules. Inner margin of 3rd segment of peduncle approximately straight, lobes on distal margin approximately equal (inner lobe >2X length of other lobes in *E. grimaldii*).

Antennal scale. Straight in both sexes (sinuous in *E. grimaldii*). Suture some distance beyond distal end of peduncle.

Eyes. Cornea at 45° angle to stalk (also in *E. grimaldii*).

Thoracopods. 4th equal in size to 2nd and 3rd.

Telson. Penultimate large spine on each side separated from terminal large spine by 5-24 small spines of equal size (in *E. grimaldii* separated by less than 5 small robust spines).

Size. Mature individuals 22 to 40 mm (29-43 mm in *E. grimaldii*).

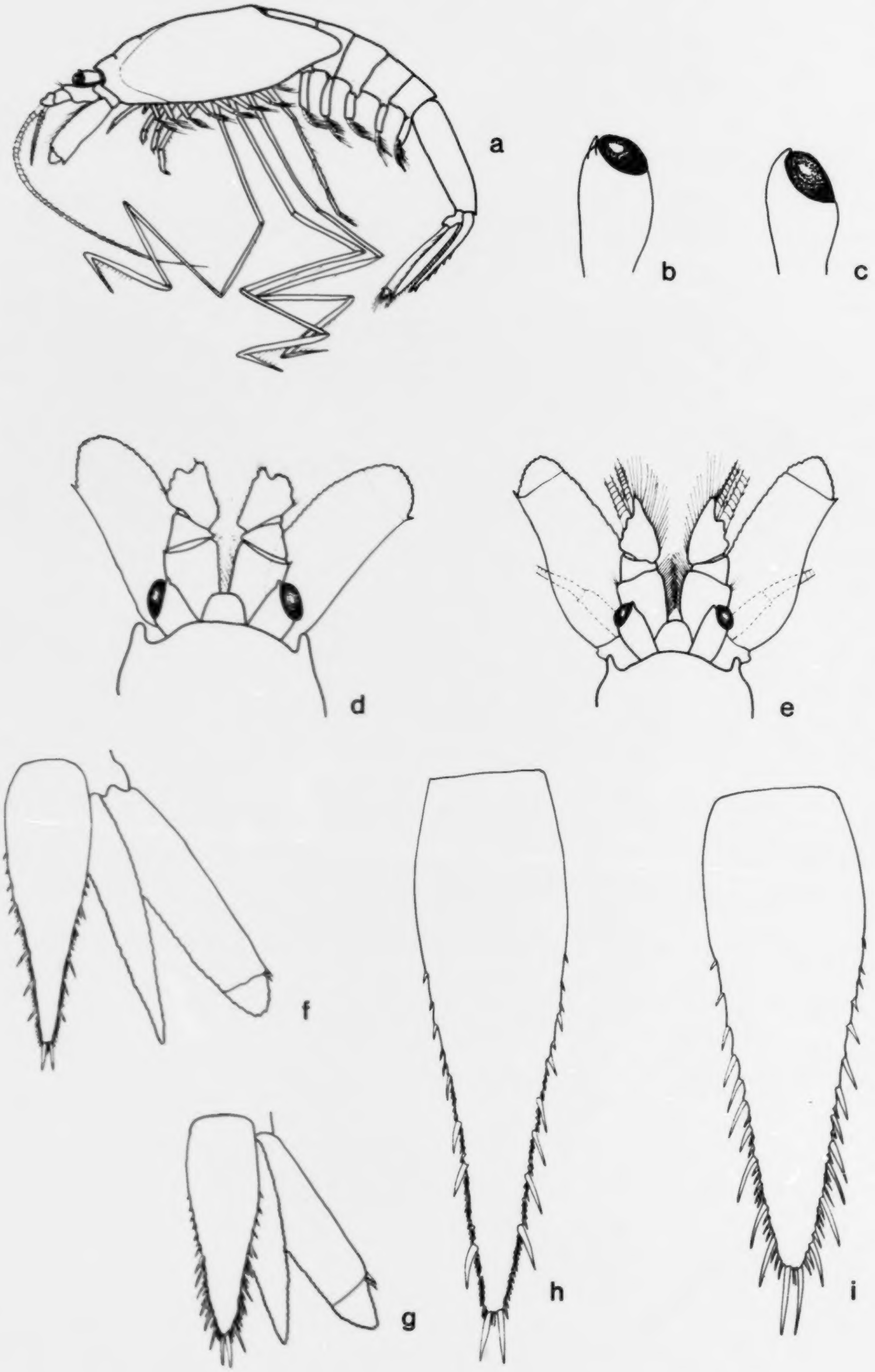
Color. Brilliant scarlet red.

TAXONOMIC NOTES Records from western Canada have been regarded as questionable affinities. Records prior to (8) and others (e.g. (5)) may not differentiate *E. unguiculata* from *E. grimaldii*. Banner (10) concluded from his California material of several populations from warm and cool temperate waters that *E. unguiculata* could not be separated from *E. australis*; he therefore concluded *E. unguiculata* to be a synonym of *E. australis*. If, however, these 2 are separate species (3, 4), his data could indicate either the presence of both species, largely *E. unguiculata* with a few *E. australis*. It is not clear from his data whether the same individuals exhibited all the deviations toward the *E. australis* condition for the character set.

O. Tattersall (7) believes Dana's original specimen of *E. australis* is probably *E. unguiculata*, in which case the description for *E. unguiculata* should replace that for *E. australis*, and *E. australis* should have a different specific epithet.

DISTRIBUTION Bathypelagic in tropical to boreal waters, 500-6500 m (6, 7); locally from the Bering Sea and British Columbia south (1, 2, 4, 5, 10, 11).

Figure. *E. unguiculata*: a. lateral view, female (6); b. eye (7); d. dorsal view, anterior end (7); f. telson and uropod (7); h. telson (9). *E. grimaldii*: c. eye (7); e. dorsal view, anterior end (7); g. telson and uropod (7); i. telson (9).



Eucopia unguiculata/E. grimaldii

Exacanthomysis Holmquist, 1981

SYNONYMY AND REFERENCES

Exacanthomysis Holmquist, 1981a (1)
Holmquist, 1982

Acanthomysis (in part)	Neomysis (in part)
Banner, 1948b	W. Tattersall, 1932
Banner, 1954c	
W.Tattersall, 1951	

CHARACTERIZATION (1)

Eyes. Normally developed with single approximately hemispherical cornea; overall length <2X mid-stalk width, much shorter than antennal scale.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed anterior.

Thoracopods. 3rd-8th with carpo-propodus of endopod 4-8 segmented.

Oostegites. 2 pairs of ordinary and 1 anterior rudimentary pair; no hair tufts; no baling lobe.

Abdomen. 6th segment with 3 discontinuous transverse, dorsolateral folds; other segments with 1 to 3 folds.

Pleopods. All rudimentary in females; all but 4th rudimentary in males, only unjointed plates; 4th with endopod >½ length of exopod; exopod 2 segmented with distal segment <1/6 proximal; 2 terminal barbed setae, 3X as long as adjacent segment.

Uropods. Short row of spines on lower inner margin of endopod adjacent to statocyst.

Telson. Narrowly triangular, length 3 times width, with narrowly truncate apex; large and/or small lateral spines full length of margins with tendency to size grouping distally; large spines generally slightly hooked; 1 pair of large apical spines with 1 pair of small spines between, no plumose setae.

TAXONOMIC NOTES The removal of Exacanthomysis from the genus Acanthomysis is based primarily on the structure of the 4th male pleopod but only on relative lengths of structures, not on their form, presence or absence. At least some of these relative lengths might be expected to change with degree of maturity. Two species for which no adult males are known are left in limbo; "Acanthomysis" stelleri and "Acanthomysis" borealis. They are here treated as "Acanthomysis" near Paracanthomysis.

Exacanthomysis alaskensis Banner, 1954

SYNONYMY AND REFERENCES

Acanthomysis alaskensis Banner, 1954c (1)

Exacanthomysis alaskensis by Holmquist, 1981a (2)
Holmquist, 1982 (3)

CHARACTERIZATION (1, 2)

Carapace. Anterolateral corners acute; rostrum with concave sides forming an acute angle at the point apex.

Antennules. Male peduncle stouter than female; with well developed process masculinus.

Antennal scale. Length 6-7 times width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 6-8 segmented.

Abdomen. 6th segment with 3 pairs transverse dorsolateral folds, slightly approaching each other dorsally and generally with a short bend forward at the dorsomedian end of each fold. 1st-5th segments have 2-3 transverse dorsal folds which may be interrupted dorsally. All folds may appear slight and therefore difficult to decipher (2).

Uropods. 4-5 spines on lower inner margin adjacent to statocyst.

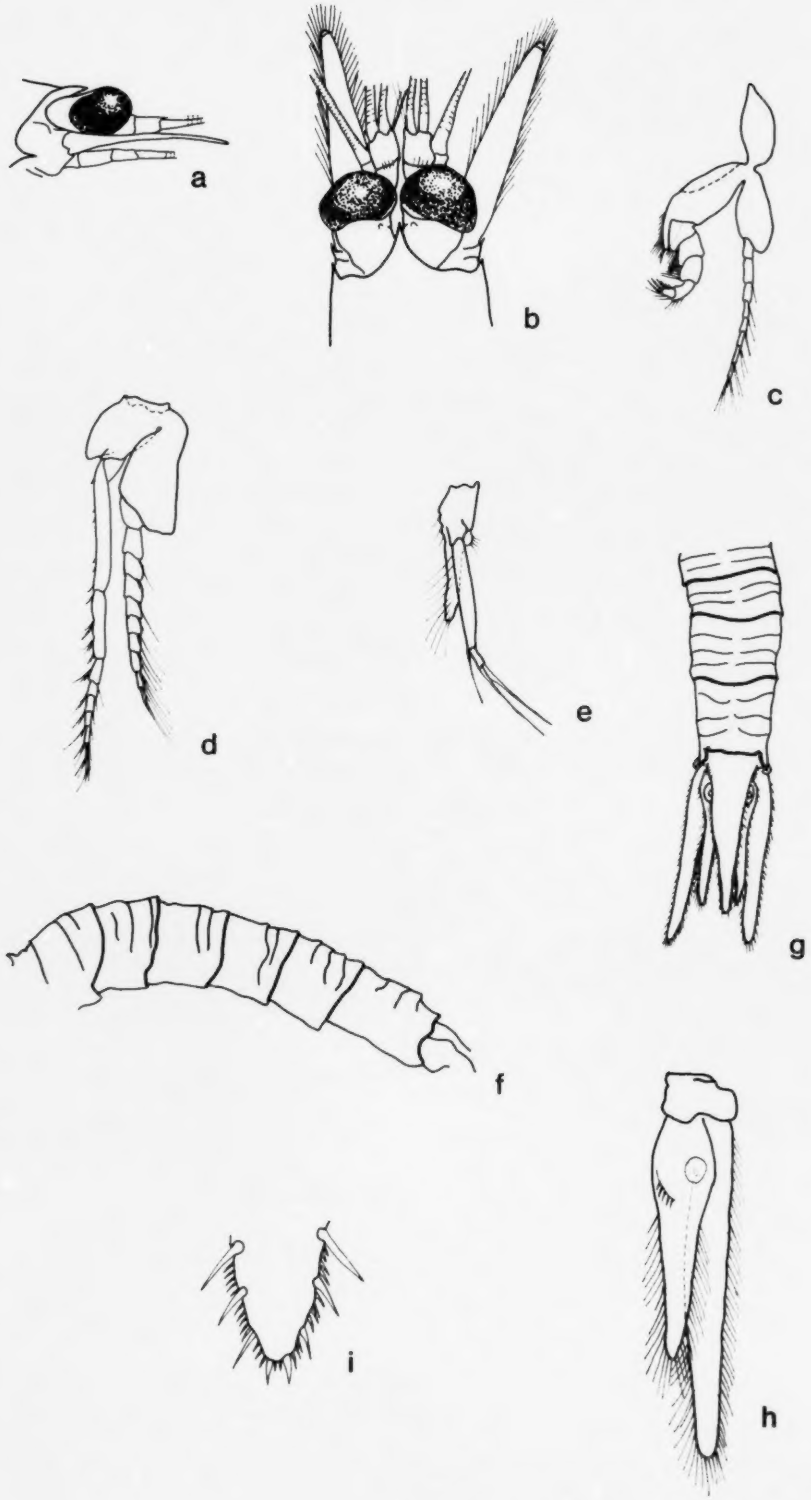
Telson. Large lateral spines do not increase in size distally, the most distal laterals extend to or beyond telson apex but are subequal to apical pair; distally 3-5 small spines between large spines.

Size. 10-20 mm.

TAXONOMIC NOTES The number and types of folds appear variable. Examination of the abdominal folds of specimens collected from Little Port Walter, Alaska, and identified by Holmquist do not agree with her drawings (2). However, as (2) noted, the folds are slight and difficult to see. A lateral view was taken from an original specimen (USNM 306446) rather than (2).

DISTRIBUTION Alaska to Washington, shallow (20 m) coastal pelagic (?and hyperbenthic).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. 1st thoracopod (1); d. 7th thoracopod (1); e. 4th male pleopod (1); f. lateral view, abdomen (original); g. dorsal view, abdomen (2); h. uropod (1); i. telson apex (1).



Exacanthomysis alaskensis

Exacanthomysis arctopacifica Holmquist, 1981

SYNONYMY AND REFERENCES

Exacanthomysis arctopacifica Holmquist, 1981a (1)
Holmquist, 1982 (2)

CHARACTERIZATION (1)

Carapace. Anterolateral corners rounded.

Antennal scale. Length 5 times width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 4-6 (generally 5) segmented.

Abdomen. 1st-4th segments with 3 folds; on each the first is discontinuous and the 2nd and 3rd are continuous dorsally; 5th segment with 2 continuous folds; 6th segment with 3 discontinuous folds.

Uropods. 6-8 spines on lower inner margin adjacent to statocyst.

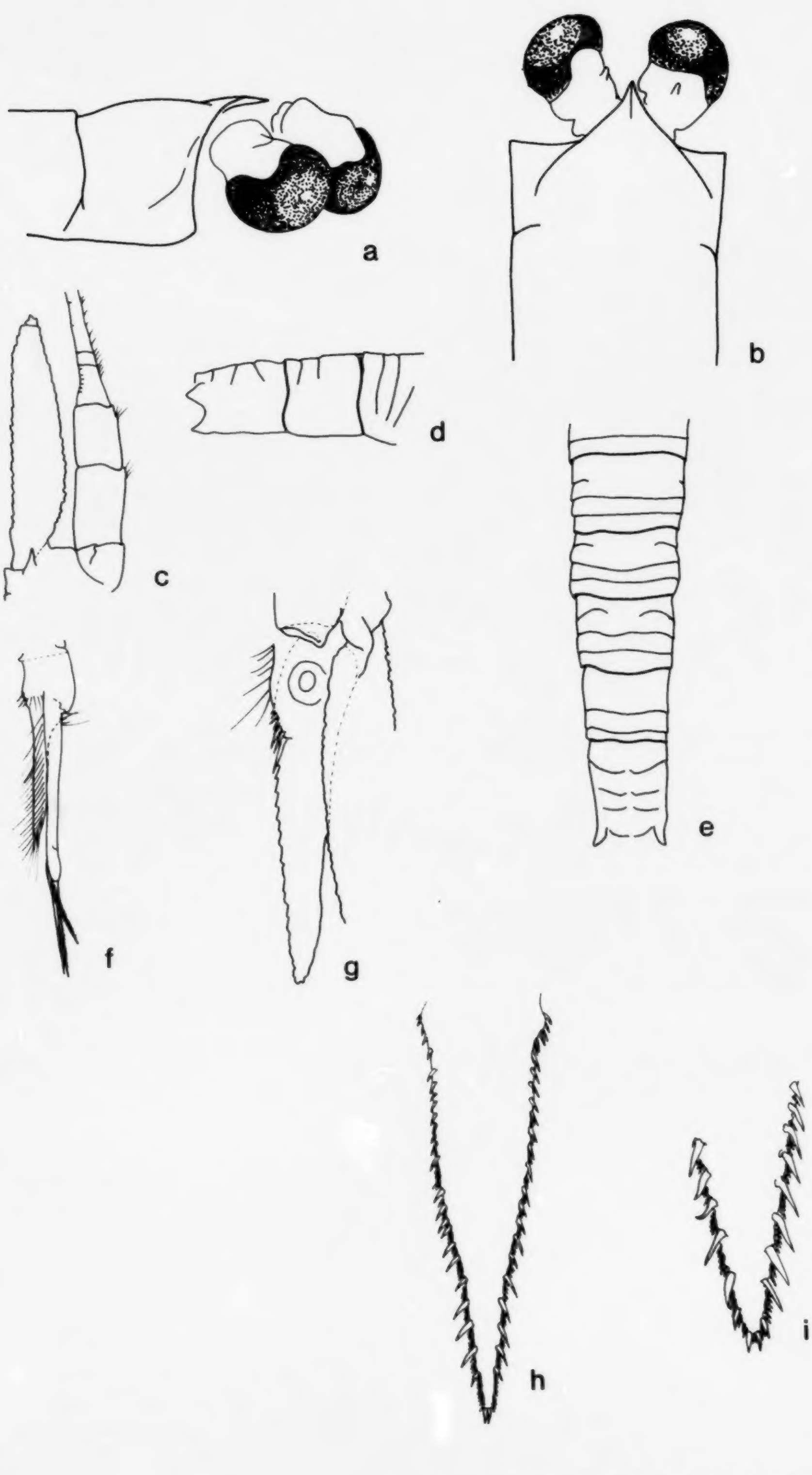
Telson. Large lateral spines generally increase in size distally. Distal ½ of telson carries 6-13 small spines between large spines.

Size. 10-15 mm.

TAXONOMIC NOTES The number of types of folds noted are based on illustrations in (1), and may not account for individual variation. Acanthomysis stelleri of W. Tattersall (1951) may also be this species.

DISTRIBUTION At present known only from Chukchi Sea, Bering Sea and southern Alaska from 0-10+ meters near shore.

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. antenna (1); d. lateral view, abdomen (1); e. dorsal view, abdomen; f. 4th male pleopod (1); g. uropod (1); h. telson (1); i. telson apex (1).



Exacanthomysis arctopacifica

Exacanthomysis davisi (Banner, 1948)

SYNONYMY AND REFERENCES

Acanthomysis davisi Banner, 1948b (1)
Banner, 1954c (2) Holmquist, 1979 (3)

Exacanthomysis davisi by Holmquist, 1981a (4)
Holmquist, 1981b (5) Holmquist, 1982 (6)

Neomysis costata of W. Tattersall, 1932 (7)

Acanthomysis costata of W. Tattersall, 1951 (8)

CHARACTERIZATION (1, 2, 3, 4, 5, 7, 8)

Carapace. Anterolateral corners rounded; rostrum with concave sides forming an acute angle at the pointed apex.

Antennules. Male peduncle slightly stouter than female.

Antennal scale. Length 4.5-6X width.

Thoracopods. 3rd-8th with carpo-propodus of endopod 4-5 segmented.

Abdomen. 1st-3rd segments with 2 folds, first of each inconspicuous; 4th-5th segments with 2-3 folds, may be discontinuous on 5th; 6th with 3 folds, all discontinuous.

Uropods. 4-5 spines on lower inner margin adjacent to statocyst.

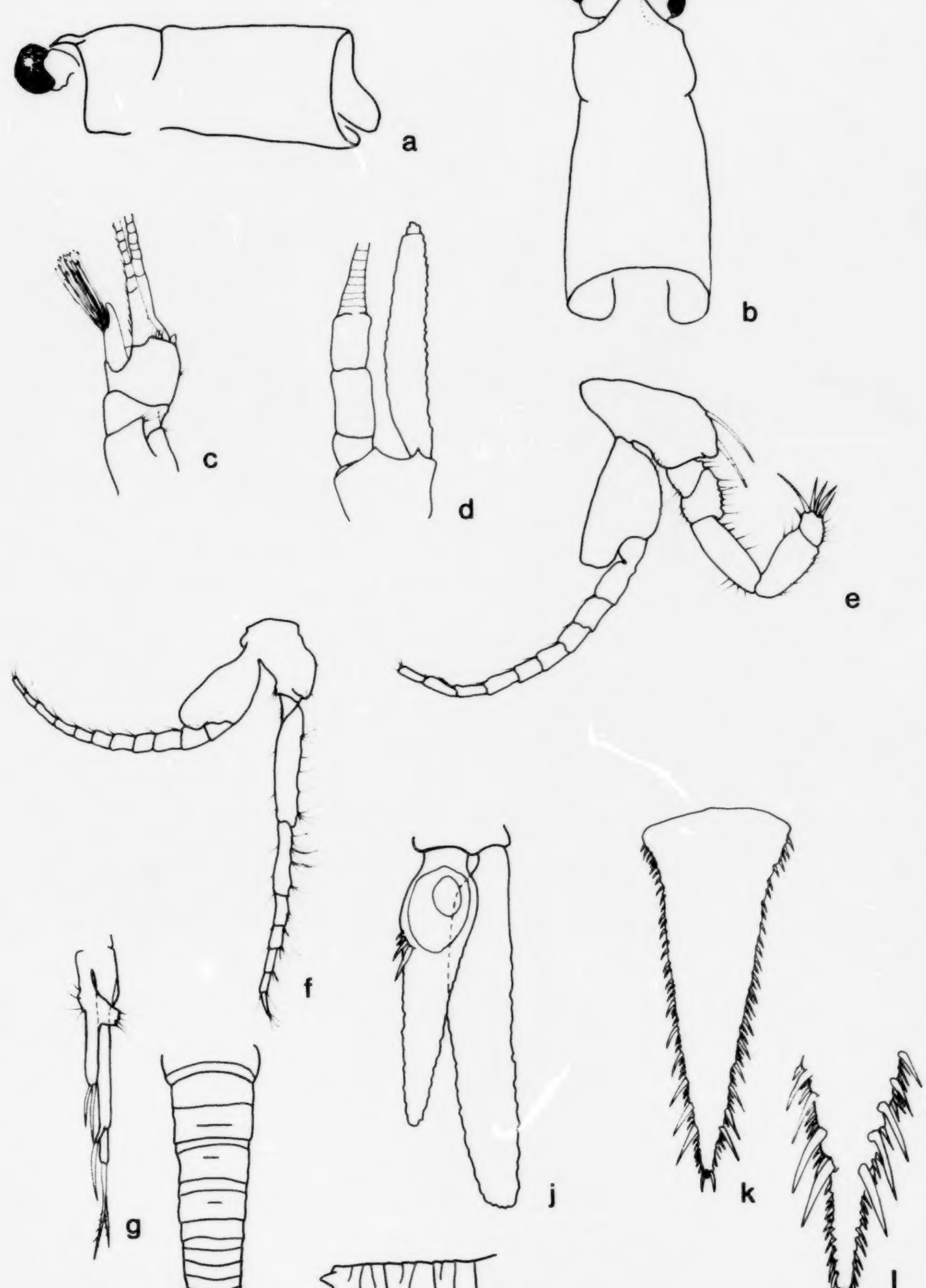
Telson. Length 2.5X basal width; large lateral spines increase in size distally; a tonguelike distal part has equal small spines but lacks large spines; 3-4 small spines between large lateral spines toward distal region.

Size. 7-12 mm.

TAXONOMIC NOTES The material described by (7) as Neomysis costata was determined by (3) to be Acanthomysis davisi as described by (1).

DISTRIBUTION Alaska to California, shallow (20 m) coastal pelagic (?and hyperbenthic) (1, 4, 5, 6, 7).

Figure. a. lateral view, anterior end (3); b. dorsal view, anterior end (3); c. lateral view, antennular peduncle (1); d. antenna (1); e. 2nd thoracopod (7); f. 3rd thoracopod (7); g. 4th male pleopod (7) ; h. dorsal view, abdomen (4); i. lateral view, abdomen (4); j. uropod (7); k. telson (7); l. telson apex (4).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Exacanthomysis davisi

Gnathophausia Willemoes-Suhm, 1873

SYNONYMY AND REFERENCES

Gnathophausia Willemoes-Suhm, 1873
Birstein and Tchindonova, 1958 (1)
Clarke 1961 (2)
Clarke 1962
Fage, 1941 (3)
Ortmann, 1906 (4)
Pequegnat, 1965 (5)
Tattersall and Tattersall, 1951 (6)
Willemoes-Suhm, 1875 (7)

CHARACTERIZATION (1, 2, 3, 4, 5, 7)

Carapace. Shield-shaped with raised longitudinal keels; posterior margin typically produced into a large, median, dorsal spine. Rostrum elongate, denticulate, spear-shaped.

Eyes. Well developed.

Mandibles. Asymmetrical, left smaller, hollowed; with lacinia mobilis on left side only.

Paragnaths. Asymmetrical, right smaller.

Maxillules. With 2-segmented palp.

Maxillae. Gland producing a luminous secretion opens on papilla.

Maxillipeds. With shortened endopod; exopod reduced or absent; epipod enlarged.

Thoracopods. 2nd (termed by some a gnathopod) slightly more robust than 3rd-8th; 3rd-8th nonchelate, with gills under carapace.

Oostegites. 7 pairs.

Abdomen. 6th segment with distinct circular groove; pleural plates distinct.

Pleopods. Well developed in both males and females; biramous.

Uropods. Divided by transverse suture on exopod near apex; no statocyst.

Telson. 2 long keels dorsally; apex with pair of large spines connected at base to form posteriorly directed crescent.

Size. Up to 350 mm including rostrum; typically 10-30 mm.

ECOLOGICAL NOTES All deep water, all probably bathy- or mesopelagic; the maxillary gland emits phosphorescent material.

TAXONOMIC NOTES Generally regarded as the most primitive genus of mysids (1, 6). A key to species (4) has been updated (5). Differences in form with size (and presumably age) have resulted in several names applied to what are now considered single species (3, 4, 5).

Gnathophausia gigas Willemoes-Suhm, 1875

SYNONYMY AND REFERENCES

Gnathophausia gigas Willemoes-Suhm, 1875

Banner, 1948a (1)
Birstein and
 Tchindonova, 1958 (2)
Fage, 1941 (3)
Nouvel, 1950b
Ortmann, 1906 (4)
Pequegnat, 1965 (5)
G.O. Sars, 1885b (6)
Taniguchi, 1969 (7)
O. Tattersall, 1955 (8)
W. Tattersall, 1951 (9)
Tattersall and Tattersall, 1951 (10)
Zimmer, 1909

Gnathophausia drepanephora Holt and Tattersall, 1905 (11)

CHARACTERIZATION (4, 6, 9, 10, 11)

Carapace. Posterior dorsal spine and paired lateral spines decrease in length with increasing size; supraorbital spine large relative to G. ingens, where it may be absent; size of antennal and branchiostegal spines varies. Rostrum length varies inversely with size; always serrated.

Antennal scale. Not jointed near apex; lanceolate in form with 2-7 large spines (relative to G. ingens); no spine terminating an outer rib (as in G. gracilis).

Abdomen. Two pairs of epimera on each of 2nd-5th segments anterior pair small and rounded; posterior pair pointed and spiniform; both pairs pointed in G. ingens.

Uropods. Outer distal margin of exopod naked; endopod setose all around.

Size. To 164 mm including the rostrum.

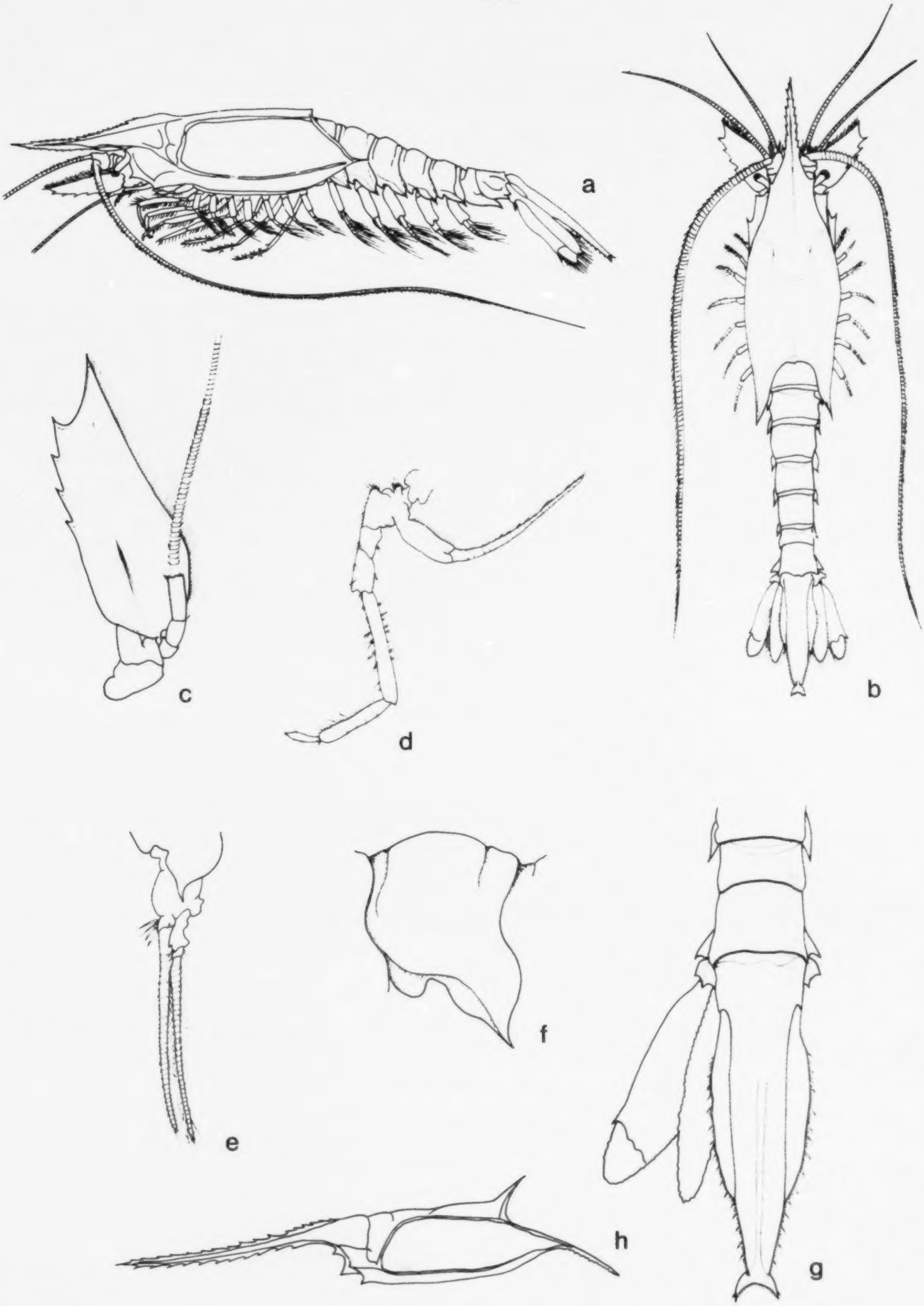
Color. Deep red to coral pink.

TAXONOMIC NOTES Changes in spination with age led to small individuals (_75 mm) being considered a separate species, G. drepanephora (11). Although the 2nd thoracopod is often called a gnathopod, it differs little from the others.

ECOLOGICAL NOTES Minimum size for sexual maturity about 120 mm (5). Most captured individuals are immature. Mature individuals are frequently taken in deeper water (5). A parasitic flagellate may attach under the abdomen and has been associated with modifications of oostegite development (1).

DISTRIBUTION Cosmopolitan in oceanic bathypelagic environments, from 600 to 4400 meters (3, 9, 11). Locally, from southern Alaska south (2, 4, 9).

Figure. a. lateral view, male (6); b. dorsal view, male (6); c. antenna (6); d. posterior thoracopod (original); e. female pleopod (original); f. epimera of 3rd-4th abdominal segments (original); g. uropods and telson (6); h. carapace of immature (11).



Gnathophausia gigas

Gnathophausia ingens (Dohrn, 1870)

SYNONYMY AND REFERENCES

Lophogaster ingens Dohrn, 1870

Gnathophausia ingens G.O. Sars, 1884
Childress and Price, 1978 (1)
Clarke, 1961 (2)
Clarke, 1962 (3)
Fage, 1941 (4)
Hansen, 1912 (5)
Hiller-Adams and Childress, 1983 (6)
Illig, 1930 (7)
Nouvel, 1943
Pequegnat, 1965 (8)
Sars, 1885a (9)
O. Tattersall, 1955 (10)
W. Tattersall, 1951

Gnathophausia calcarata G.O. Sars, 1884
Ortmann, 1906 (11)
Sars, 1885a (12)
Zimmer, 1927

Gnathophausia doryphora Illig, 1906 (13)

CHARACTERIZATION (2, 3, 4, 8, 9, 12, 13)

Carapace. Posterior dorsal spine and paired lateral spines decrease in length with increasing size; supraorbital spine small relative to *G. gigas* may be absent. Rostrum relative length decreases with increasing size; spination almost absent when >150 mm.

Antennal scale. Not jointed near apex (jointed in other members of genus except *G. gigas*); ovate in form with spines small relative to *G. gigas*; no spine terminating an outer rib as in *G. gracilis*.

Abdomen. Two pairs of epimera on each of 2nd-5th segments; both anterior and posterior pairs pointed and spiniform.

Size. Up to 350 mm including rostrum; captured individuals typically <160 mm (females this size not sexually mature).

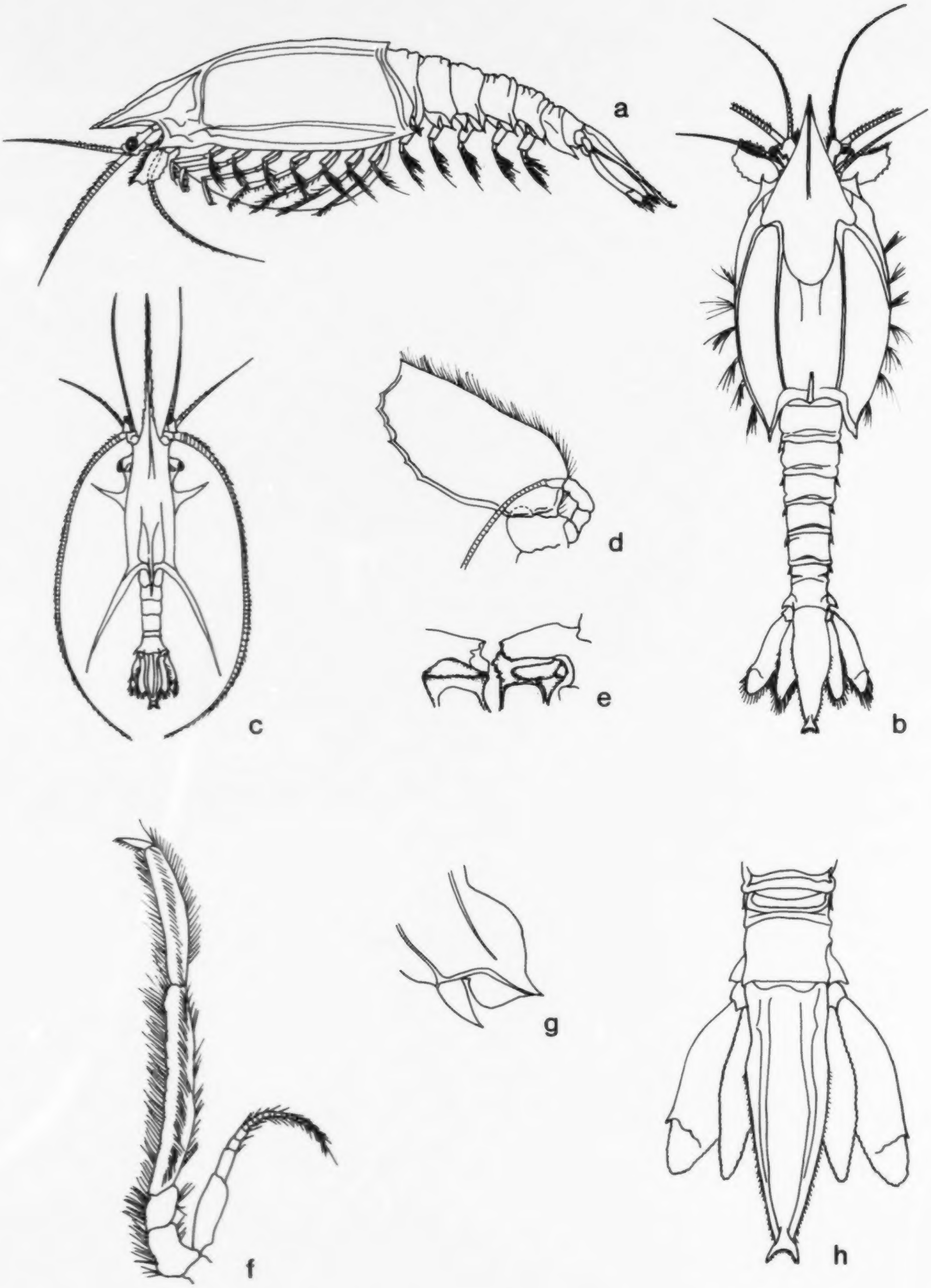
Color. Orange brown to carmine red; brown to black eyes.

TAXONOMIC NOTES Changes in spination with age led to small individuals being considered a separate species, *G. calcarata* (5, 10, 11, 13).

ECOLOGICAL NOTES Size at sexual maturity about 150 mm; larger individuals occur in deeper water, may live to 8 years, but only reproduce once during this time (1); a parasitic flagellate may attach under the abdomen (4, 8); subject of several studies on energetics (6).

DISTRIBUTION In world oceans at mid to low latitudes; from 274 to 3914 m (8); off Oregon (E. Krygier, pers. comm.); from northern California south (8, 11).

Figure. a. lateral view, female (9); b. dorsal view, female (9); c. juvenile (7); d. antennal (9); e. mandibles and paragnaths (2); f. posterior thoracopod (9); g. abdominal epimera (2); h. uropods and telson (9).



Gnathophausia ingens

Heteromysis S.I. Smith, 1873

SYNONYMY AND REFERENCES

Heteromysis S.I. Smith, 1873
Ii, 1964 (1)
Mauchline, 1980 (2)
O. Tattersall, 1967 (3)

CHARACTERIZATION (1, 2, 3)

Carapace. Not spinous.

Antennal scale. Small, ovate, setose all around.

Eyes. Rarely absent.

Labrum. Anterior end bluntly rounded.

Mandibles. Normal cutting lobe, and well developed palp.

Thoracopods. 3rd differs from 4th-8th; propodus undivided and fused with carpus; with modified spines; in most, dactyl and nail can fold down on carpo-propodus to form a subchela; may be much larger than other thoracopods; endopod of 4th-8th divided by transverse articulations.

Oostegites. 2 pairs.

Penes. Usually long and cylindrical.

Abdomen. No pleura.

Pleopods. Rudimentary in both sexes; however, in a few species pseudopodial lobes may be sufficiently developed to appear like an exopod of biramous appendage.

Uropods. Both rami oval and broadly rounded; exopod setose all around; endopod typically a few to many spines on inner margin; statocyst.

Telson. Cleft; with spines on all margins.

TAXONOMIC NOTES 36 species known (2); 27 are included in key by (3).

ECOLOGICAL NOTES Includes some which are commensal with other groups; many species rarely found (3).

Heteromysis odontops Walker, 1898

SYNONYMY AND REFERENCES

Heteromysis odontops Walker, 1898a (1)
Banner, 1948b (2)
W. Tattersall, 1933
O. Tattersall, 1967 (3)

Non Heteromysis odontops of Tattersall, 1951 (=H. panamensis) (4)

?Heteromysis spinosus Holmes, 1900 (5)

CHARACTERIZATION (1, 2, 3)

Rostrum. Short, not covering eyes; apex acute with rounded tip.

Antennules. 1st and 3rd segments of peduncle approximately equal; 2nd segment short with oblique distal margin approximately 45°.

Antennal scale. Slightly longer than antennal peduncle; extends to middle of 3rd segment of antennular peduncle; with distal suture.

Eyes. Cornea equal to 1/3 of eye; tooth at distal margin.

Thoracopods. 3rd endopod with carpo-propodus swollen, inner margin with 7 strong spines, 3 pairs on distal half and single spine proximal to them; 4th-8th endopods with carpo-propodus 8 segmented.

Pleopods. All appear uniramous, no pseudobranchial lobes; in male, 3rd and 4th strap-shaped (laterally flattened) with 7-18 short spines distally; 5th lanciform, lacking such spines.

Uropods. Exopod extends 1/3 of length beyond telson; endopod only slightly longer than telson, with 4 slender equally spaced spines on inner margin near statocyst.

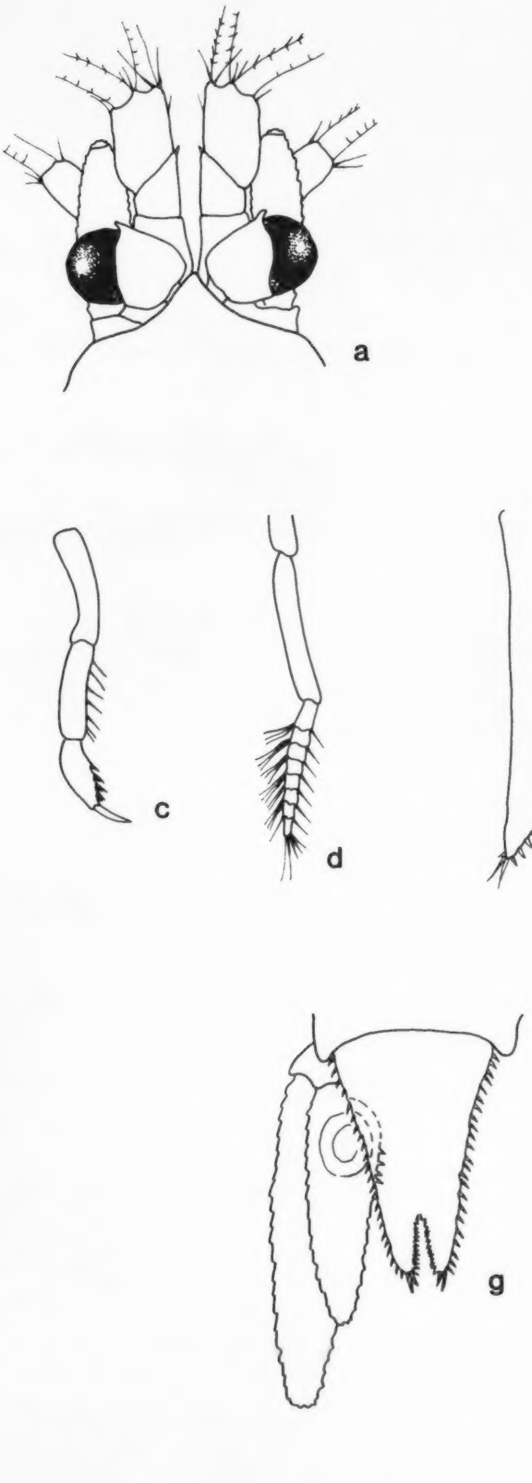
Telson. Length 1.5 times width; 23-24 lateral spines on each side; apical cleft with about 30 equally spaced small spines total.

Size. 12 mm.

TAXONOMIC NOTES Specimen figures in (4) are H. panamensis (3). Insufficient material is available to conclusively establish identity of H. spinosus (5) with H. odontops.

DISTRIBUTION Single original record of 8 individuals from Washington (1, 2); one additional record from Victoria, B.C. (E.L. Bousfield). Record of H. spinosus from southern California.

Figure. a. dorsal view, anterior end (3); b. antennular peduncle (1); c. endopod of 3rd thoracopod (1); d. endopod of 8th thoracopod (1); e. 3rd male pleopod (3); f. 5th male pleopod (3); g. uropod and telson (3).



Heteromysis odontops

Holmesiella Ortmann, 1908

SYNONYMY AND REFERENCES

Holmesiella Ortmann, 1908 (1)
Banner, 1948a (2)
Mauchline, 1980 (3)
Murano, 1976 (4)

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Not spinous.

Rostrum. Small, rounded.

Antennal scale. Outer margin straight without setae, terminated by spine.

Eyes. Well developed with large cornea.

Mandibles. Normal cutting lobe, and well developed palp.

Labrum. Normal shape; rounded behind, symmetrical, no forward process.

Thoracopods. 2nd with short rounded dactyl, a gnathopod; in 3rd-8th propodus is separated from carpus by oblique articulation; propodus 2 segmented; knob on basipodite at base of endopod.

Oostegites. 3 ordinary pairs; anterior pair reduced.

Abdomen. No pleura.

Pleopods. Rudimentary in female; in male 1st rudimentary or endopod reduced; 2nd-5th biramous, natatory; endopod of 4th elongated, terminating in long stout seta.

Uropods. Endopod with row of spines along proximal part of inner margin; statocyst well developed.

Telson. Long, triangular, with lateral spines; apex with a pair of plumose setae and a pair of very small spines between a pair of long spines terminating the lateral series.

TAXONOMIC NOTES Only two species are known; H. affinis has only been reported from Japan. Banner (2) indicates endopod of 1st pleopod is elongate; this should be 4th pleopod.

Holmesiella anomala Ortmann, 1908

SYNONYMY AND REFERENCES

Holmesiella anomala Ortmann, 1908 (1)
Banner, 1948a (2)
Birstein and Tchindonova, 1958 (3)
Esterley, 1914 (4)
Fulton, 1968 (5)
Ii, 1964 (6)
Murano, 1976 (7)
W. Tattersall, 1933 (8)
W. Tattersall, 1951 (9)

CHARACTERIZATION (1, 2, 4, 7, 9)

Antennae. Proximal end of 3rd segment of peduncle inflated but not overhanging distal end of 2nd segment in dorsal view.

Thoracopods. 2nd with short, conical dactyl, a gnathopod.

Pleopods. Endopod of 4th in male >2X exopod length.

Color. Body transparent with red chromatophores. Eyes red to golden red.

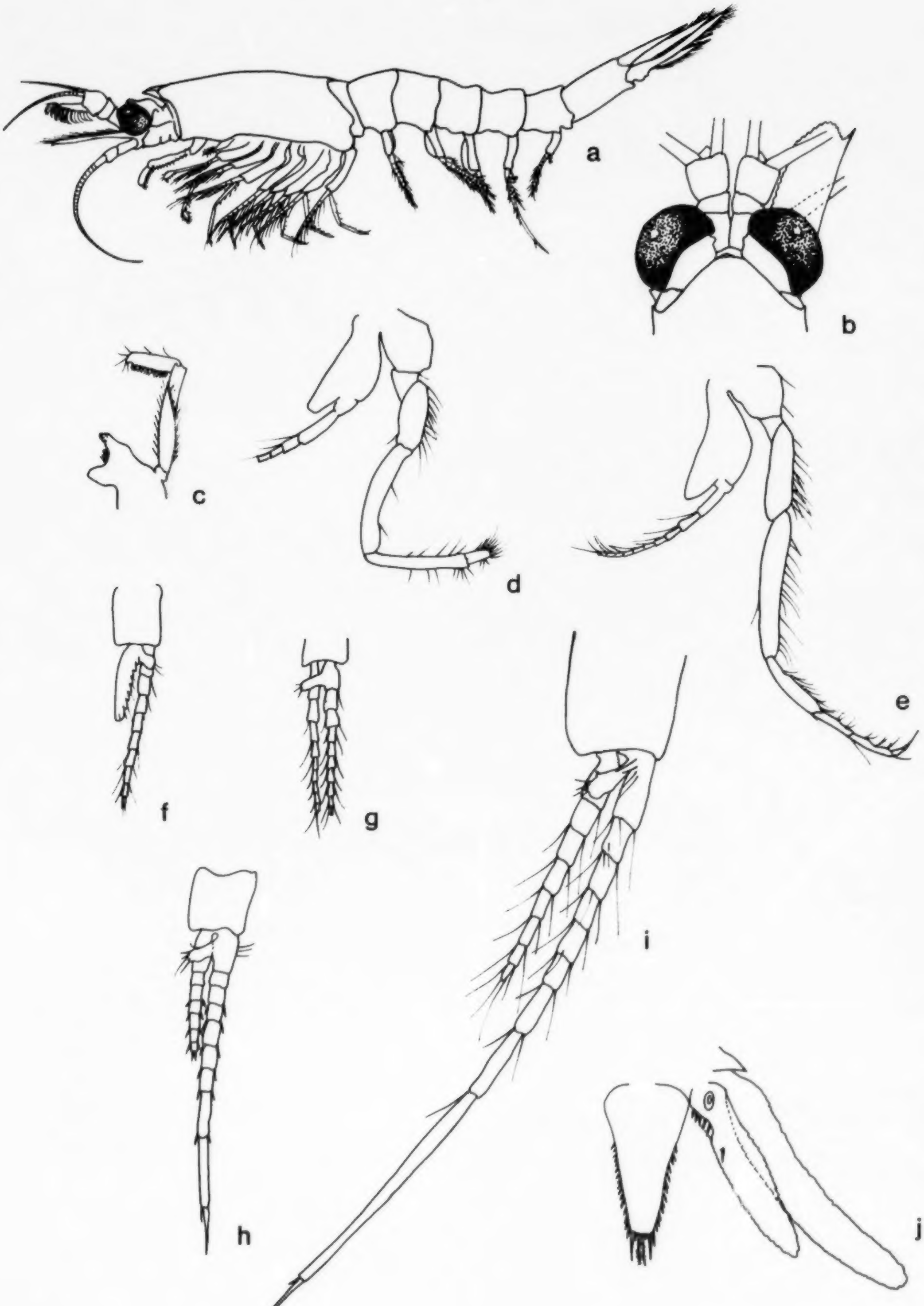
Size. Coastal form 15-20+ mm; deep water form 25-38 mm.

TAXONOMIC NOTES Length of endopod in 4th male pleopod increases considerably with relatively small increases in overall size, but in the size range examined it is always considerably longer than the exopod. The setae change from simple to plumose with increase in size (9). Original drawings are of 18 mm female from Alice Arm, B.C. This species has been refigured by Murano and Krygier (1985).

ECOLOGICAL NOTES Both species are considered to have a large size deep water race and small shallow water race. Differences between these are summarized by (2). One of the most common pelagic mysids in the Strait of Georgia.

DISTRIBUTION North Pacific to 1000 m (3, 6); in NE Pacific from Alaska to southern California; <75-900 m (2, 4, 5, 8, 9).

Figure. a. lateral view, female (original); b. dorsal view, anterior end, young male (7); c. mandible (1); d. 2nd thoracopod (1); e. 4th thoracopod (1); f. 1st male plepod (1); g. 3rd male pleopod (1); h. 4th immature male pleopod (9); i. 4th mature male pleopod (9); j. uropod and telson (original + 1, 7).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Holmesiella anomala

Holmesimysis Holmquist, 1979

SYNONYMY AND REFERENCES

Holmesimysis Holmquist, 1979 (1) Mauchline, 1980

CHARACTERIZATION (1)

Carapace. Anterolateral corners rounded to angular; no supraocular spine; rostrum bluntly pointed.

Antennules. No processes in male peduncle.

Antennal scale. Setose all around; apex rounded, marked by suture.

Labrum. Long, acute, frontal process.

Mandibles. Normal cutting lobe.

Maxillules. Terminal lobe with spines and/or setae; frontal margin with humplike projection.

Thoracopods. Epipodite of 1st with long seta; 3rd-8th with carpo-propodus divided into 4-8 subsegments.

Oostegites. 2 pairs, 1 rudimentary and anterior pair with baling lobe; no hair tufts.

Abdomen. 6th segment with mid-dorsal triangular process at posterior margin; additional processes present or absent; transverse folds apparent to absent.

Pleopods. All rudimentary in females; 1st, 2nd, 3rd, and 5th rudimentary in males, only small unjointed plates; 4th male with undivided endopod _½ length of exopod, exopod 1-2 segmented; 2 terminal barbed filaments short, peglike.

Uropods. 3-8 spines on lower inner margin of endopod adjacent to statocyst.

Telson. Linguiform, entire lateral margin with spines; apex truncate; 2 size classes of spines, larger increase in size distally, groups of small spines between each large spine distally; at apex 2 pairs of larger spines with one pair of small spines medially.

TAXONOMIC NOTES Holmquist (1) assigned 5 species to this genus; 3 were previously in *Acanthomysis* and 2 were considered new. She notes that most of the characters distinguishing species are not easy to describe. Moreover, all species occur in British Columbia in similar, if not identical, habitats. Holmquist recorded only one species from California but few samples were examined. L.G. Gleye (pers. comm.) questions the validity of separating the five morphs at the specific level but additional populations must be analyzed to settle the question.

DISTRIBUTION To date only known from shallow and intertidal waters of the NE Pacific except for one record from Hawaii.

Holmesimysis costata (Holmes, 1900)

SYNONYMY AND REFERENCES

Holmesimysis costata (Holmes, 1900)
Holmquist, 1979 (1) Holmquist, 1981b (2) Holmquist, 1982 (3)

Mysis costata Holmes, 1900 (4)
Hansen, 1913b (5)

Non *Neomysis costata* of W. Tattersall, 1932 (6) (=*Exacanthomysis davisi*)

Non *Acanthomysis costata* of W. Tattersall, 1951 (7)
of Banner, 1954c (8)

CHARACTERIZATION (1, 3, 4, 5)

Thoracopods. Endopods of 3rd-8th sparsely setose; carpo-propodus 4-6 segmented; plate-like segment of exopod without spinules.

Abdomen. 1st-5th segments with 2 dorsal transverse folds, occasionally 3 in 1st-3rd; anterior dorsal region of 6th segment with anterior angular fold; posterior dorsal region with curving fold on each side of midline. Posterior process on 6th, but not on 1st-5th.

Uropods. 3, occasionally 4, spines on lower inner margin of endopod adjacent to statocyst.

Telson. Most distal of large lateral spines thick relative to those in other 4 local species; their ends subequal to telson apex excluding apical spines.

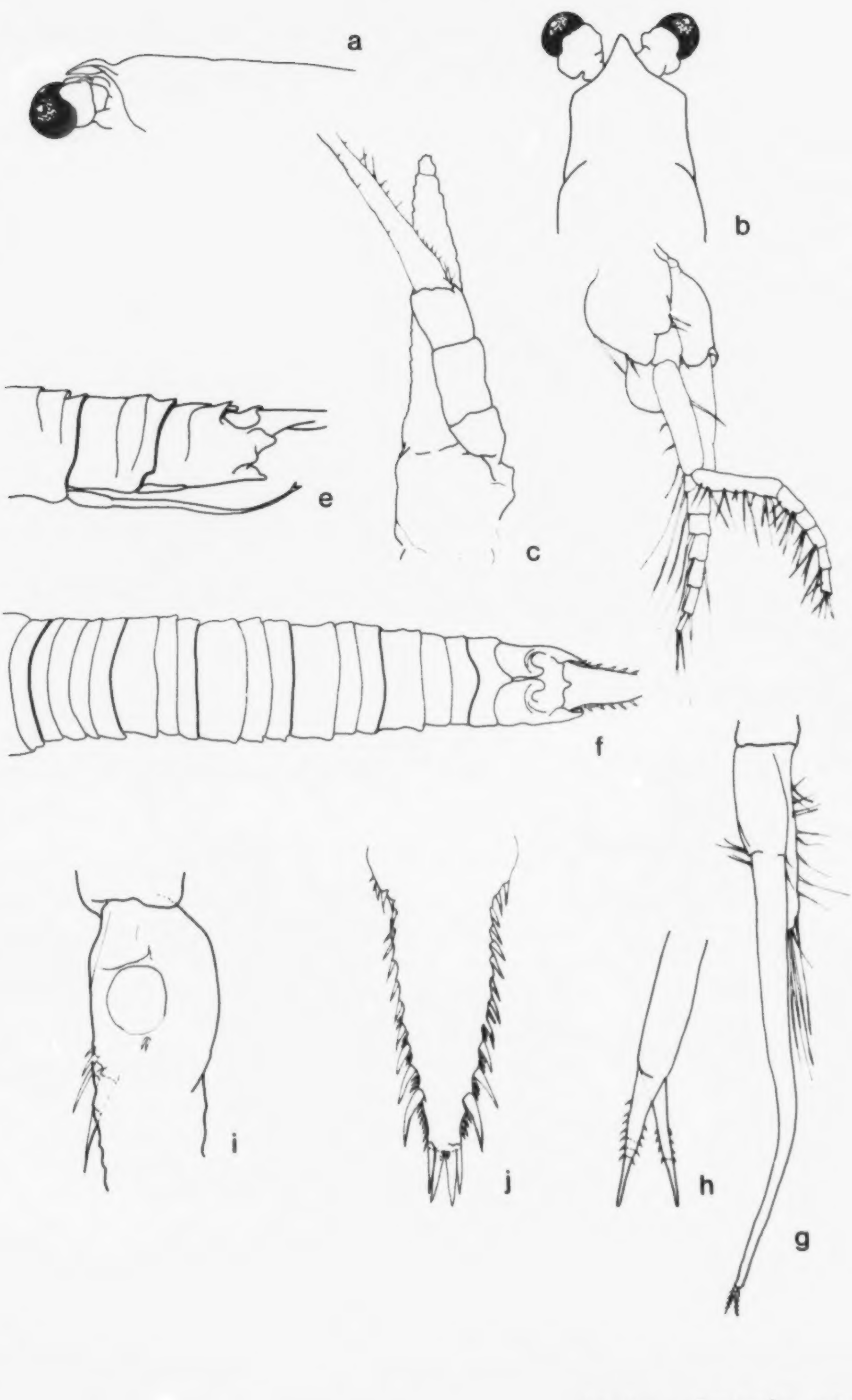
Size. 7-13 mm.

TAXONOMIC NOTES The specimens described and figured by (6, 7) and, at least in part, characterized by (8) do not fit the genus *Holmesimysis*. Pre 1980 references to the biology and distribution of *N. costata* and *A. costata* may refer to one or more of the other species of *Holmesimysis* or to *Exacanthomysis davisi* (1). The suture on the exopod of the male pleopod may or may not be visible.

ECOLOGICAL NOTES Ranges from moderately exposed to protected beaches on sand, mud, cobble, boulder bottoms (1). Occurred frequently in conjunction with 4 other species from this area in samples of (3).

DISTRIBUTION From northern British Columbia to southern California, littoral to a few meters (1, 3).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. antenna (2); d. 7th thoracopod (1); e. lateral view, abdomen (1); f. dorsal view, abdomen (1); g. 4th male pleopod (1); h. 4th male pleopod, terminal segment (1); i. uropod (1); j. telson (1).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Holmesimysis costata

Holmesimysis nuda (Banner, 1948)

SYNONYMY AND REFERENCES

Holmesimysis nuda (Banner, 1948)
Holmquist, 1979 (1) Holmquist, 1981b (2) Holmquist, 1982 (3)

Acanthomysis sculpta var. nuda Banner, 1948b (4)

CHARACTERIZATION (1, 3)

Thoracopods. Endopods of 3rd-8th sparsely setose; carpo-propodus 4-7 segmented; plate-like segment of exopod without spinules.

Abdomen. 1st-2nd segments with no dorsal transverse folds; 3rd occasionally with 1, rarely 2; 4th none, 1 or rarely 2; 5th-6th none or 1; fold on segment 6 when present is angular, with apex directed posteriorly. Posterior process on 6th, but not on 1st-5th.

Uropods. 3 or 4 spines on lower inner margin of endopod adjacent to statocyst.

Telson. About 18-20 large lateral spines per side; most distal of these smaller than in H. costata or H. sculptoides; do not reach telson apex.

Size. 8-14 mm.

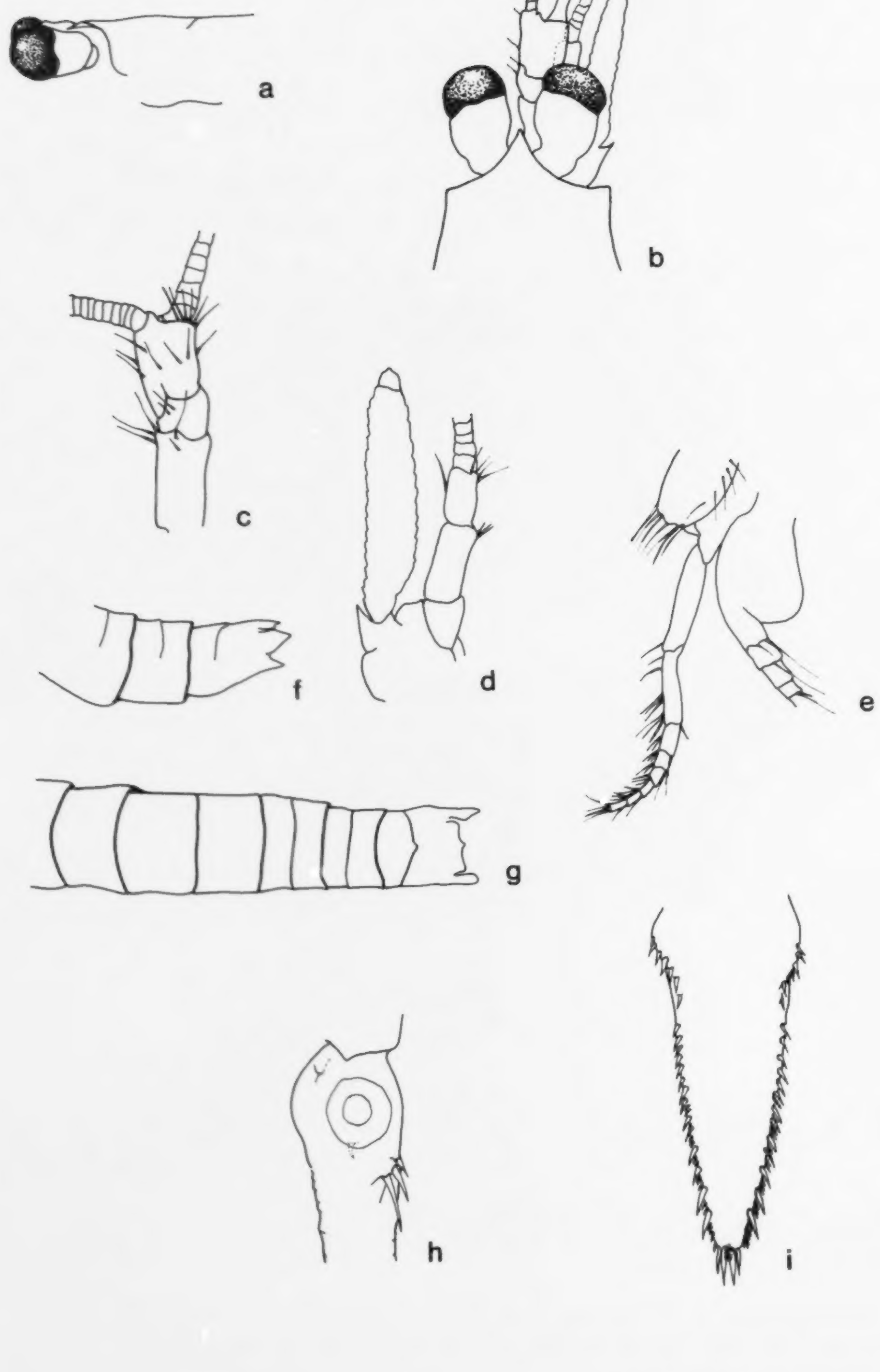
Color. Variable.

TAXONOMIC NOTES Banner (4) described this species as a variety noting that forms with sculptured (H. sculpta and H. sculptoides) and smooth (H. nuda) abdomens were never taken in the same sample although their ranges overlapped.

ECOLOGICAL NOTES Ranges from moderately exposed to protected beaches on sand, mud, cobble, boulder bottoms (1). Locally common and found in conjunction with H. costata and H. nudensis.

DISTRIBUTION From British Columbia to Washington, littoral to a few meters (1, 3).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (4); c. antennular peduncle, female (4); d. antenna (4); e. 8th thoracopod (1); f. lateral view, abdomen (1); g. dorsal view, abdomen (1); h. uropod (1); i. telson (1).



Holmesimysis nuda

Holmesimysis nudensis Holmquist, 1979

SYNONYMY AND REFERENCES

Holmesimysis nudensis Holmquist, 1979 (1)
Holmquist, 1982 (2)

CHARACTERIZATION (1)

Thoracopods. Endopod of 3rd-8th densely setose; carpo-propodus 6-7 segmented; plate-like segment of exopod without spinules.

Abdomen. 1st-3rd segments with no dorsal transverse folds; 4th rarely 1; 5th occasionally 1; 6th rarely 1, but when present always slightly bent, with apex directed posteriorly. Posterior process on 6th, mid-dorsally and often laterally on 5th, but not on others.

Uropods. 4-8, generally 5-6, spines on lower inner margin of endopod adjacent to statocyst.

Telson. 18-23 large lateral spines per side; most distal of these smaller than in *H. costata* or *H. sculptoides*; generally reach beyond telson apex.

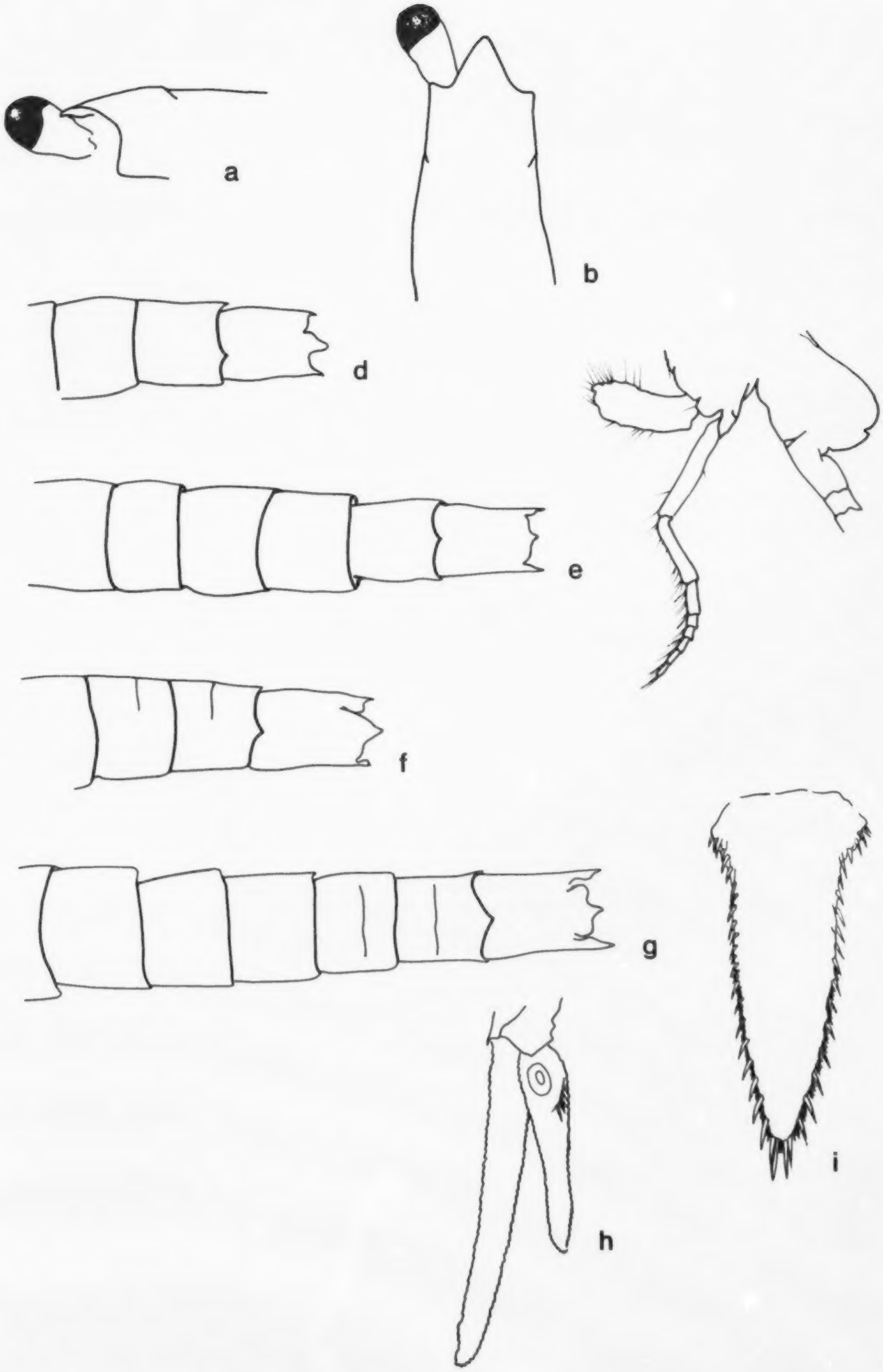
Size. 9-13 mm.

Color. Variable.

TAXONOMIC NOTES Species based on 100 specimens but taken from only one locality on two different occasions. Specimen used for original drawing is from Graham Island, B.C. (NMC-C-1984-942) and identified by Holmquist.

DISTRIBUTION From Masset, British Columbia, littoral (1). Rarely occurs in this area, but has been reported in samples with *H. costata* and *H. nuda* (3).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. 8th thoracopod (1); d. lateral view, abdomen, lacking transverse folds (1); e. dorsal view, abdomen, lacking transverse folds (1); f. lateral view, abdomen, with transverse folds (1); g. dorsal view, abdomen, with transverse folds (1); h. uropod (orig.); i. telson (1).



Holmesimysis nudensis

Holmesimysis sculpta (W. Tattersall, 1933)

SYNONYMY AND REFERENCES

Holmesimysis sculpta (W. Tattersall, 1933)
Holmquist, 1979 (1) Holmquist, 1982 (2)

Neomysis sculpta W. Tattersall, 1933 (in part) (3)

Acanthomysis sculpta
Banner, 1948b (in part?) (4) ?Smith and Carlton, 1975
Banner, 1954d (in part?) (5) W. Tattersall, 1951 (in part) (7)
?Green, 1970 (6)

CHARACTERIZATION (1)

Thoracopods. Endopods of 3rd-8th densely setose; carpo-propodus 6-8 segmented; plate-like segment of exopod with at least 1 spinule.

Abdomen. 1st segment with 3 dorsal transverse folds; 2nd-6th with 2; anterior fold on 6th angular, with rounded apex directed posteriorly; posterior fold of 6th with curving fold on each side of midline; posterior processes also dorsally on 4th, 5th, and sometimes 3rd posterior process laterally on 5th.

Uropods. 6 or 7 spines on lower inner margin of endopod adjacent to statocyst.

Telson. About 18 large lateral spines per side; most distal of these smaller than in H. costata or H. sculptoides; their ends fall short of the telson apex (excluding the apical spines) by a distance about equal to their length.

Size. To 13 mm.

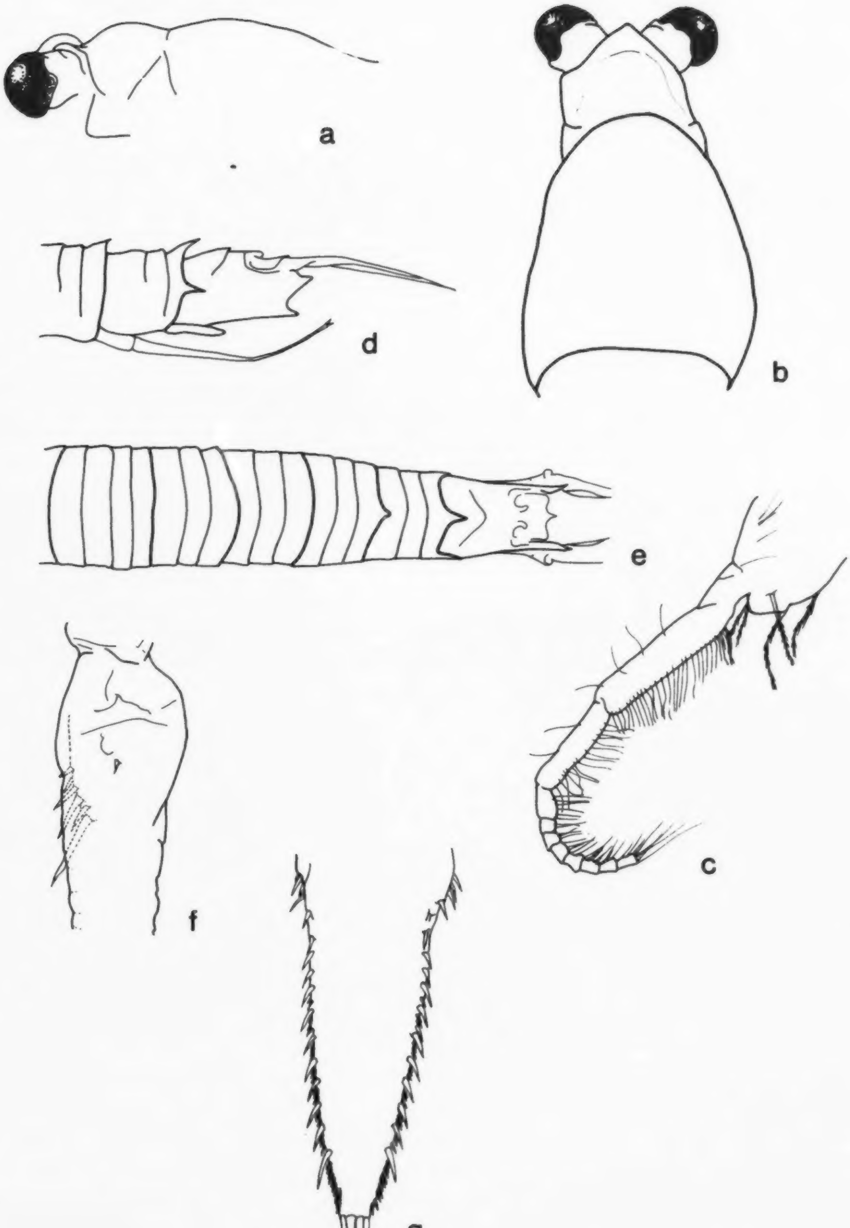
Color. Variable.

TAXONOMIC NOTES Descriptions prior to 1980 (3, 4, 5, 7) may include H. sculptoides.

ECOLOGICAL NOTES Identified by Holmquist from only two localities; a biological study by (6) may refer to either this species or H. sculptoides. Occurs very rarely, but has been found with H. costata. P. Slattery (pers. comm.) found gray whales feeding on this species and Acanthomysis columbiae in Pachena Bay, B.C.

DISTRIBUTION British Columbia and ?California (not differentiated from H. sculptoides).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (4); c. 4th thoracopod (1); d. lateral view, abdomen (1); e. dorsal view, abdomen (1); f. uropod (1); g. telson (1).



Holmesimysis sculpta

Holmesimysis sculptoides Holmquist, 1979

SYNONYMY AND REFERENCES

Holmesimysis sculptoides Holmquist, 1979 (1)
Holmquist, 1982 (2)

Neomysis sculpta W. Tattersall, 1933 (in part)? (3)

Acanthomysis sculpta in part?
Banner, 1948b (in part?) (4)
Banner, 1954d (in part?) (5)
?Green, 1970 (6)
?Smith and Carlton, 1975
W. Tattersall, 1951 (in part) (7)

CHARACTERIZATION (1)

Thoracopods. Endopods of 3rd-8th sparsely setose; carpo-propodus 5-6 segmented.

Abdomen. 1st segment with 2 or 3 dorsal transverse folds; 2nd-6th with 2; anterior fold on 6th angular, with pointed apex directed posteriorly; posterior of 6th with curving fold on each side of midline; posterior processes on 6th and laterally on 5th.

Uropods. 3-5 spines on lower inner margin of endopod adjacent to statocyst.

Telson. About 18-20 large lateral spines per side; most distal of these thinner than in H. costata but longer than other 3 species; their ends extend to or beyond the telson apex (excluding the apical spines).

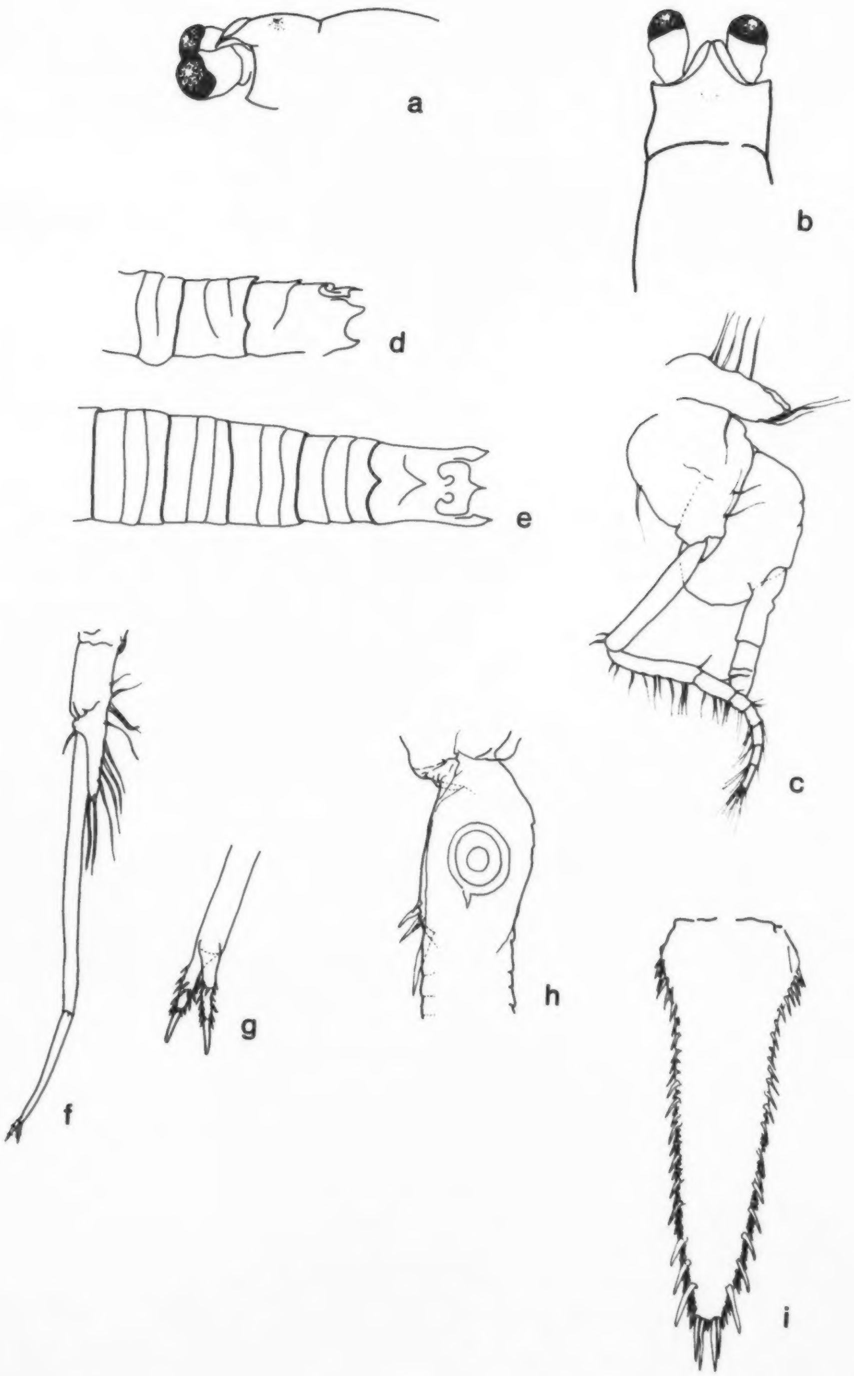
Size. 8-12 mm.

TAXONOMIC NOTES Descriptions prior to 1980 (3, 4, 5, 7) may include H. sculptoides.

ECOLOGICAL NOTES Occasionally occurs in this area, and has been collected with H. costata (3).

DISTRIBUTION British Columbia and Washington, littoral (1, 2).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (4); c. 6th thoracopod (1); d. lateral view, abdomen (1); e. dorsal view, abdomen (1); f. 4th male pleopod (1); g. 4th male pleopod, terminal segment (1); h. uropod (1); i. telson (1).



Holmesimysis sculptoides

Inusitatomysis Ii, 1940

SYNONYMY AND REFERENCES

Inusitatomysis Ii, 1940

Banner, 1948b (1)	Mauchline, 1980
Ii, 1964 (2)	Mauchline and Murano, 1977 (5)
Holmquist, 1982 (3)	W. Tattersall, 1951 (6)

CHARACTERIZATION (1, 2, 3, 4, 5, 6)

Eyes. Well developed.

Antennules. Peduncle stout; with conical process masculinus.

Antennal scale. Outer margin devoid of setae but serrate and terminating in a large spine.

Labrum. Rounded anteriorly.

Mandibles. Normal cutting lobe.

Thoracopods. 1st with elongate endite on coxa, large nail on terminal segment; 2nd a gnathopod with merus and carpo-propodus elongate and no nail on short dactyl; 3rd-8th long and slender with carpo-propodus divided into 3 segments by proximal transverse and distal oblique articulations.

Oostegites. 3 pairs, with additional rudimentary pair anteriorly.

Pleopods. All rudimentary in females, and 1st, 2nd, 3rd and 5th rudimentary in males, only small unjointed plate; 4th male with no exopod, elongate endopod multiarticulate with pair of setae at distal end of each joint.

Telson. Lateral margins with spines; cleft with serrations on margins and with pair of plumose setae at apex.

TAXONOMIC NOTES Two species are known, both occurring in the NE Pacific; they may be identical (3). Placement within the Mysini is uncertain; other members of this tribe have antennal scales with setae all around and biramous 4th male pleopods (2, 3, 6).

Inusitatomysis insolita Ii, 1940

SYNONYMY AND REFERENCES

Inusitatomysis insolita Ii, 1940
Holmquist, 1982 (1)
Ii, 1964 (2)

Insuitatomysis serrata W. Tattersall, 1951 (3)
Banner, 1954d (4)
?Inusitatomysis californica Bacescu and Gleye, 1979 (5)

Inusitatomysis species of Banner, 1948b (6)

CHARACTERIZATION (1, 2, 3, 4, 6)

Carapace. Anterolateral margin may vary from rounded to pointed.

Rostrum. Short, acute, with pointed apex.

Antennal scale. 6-8 spines on outer margin.

Eyes. Cornea reniform in dorsal view and oval in lateral view.

Uropods. Endopod with single spine on lower inner margin adjacent to statocyst.

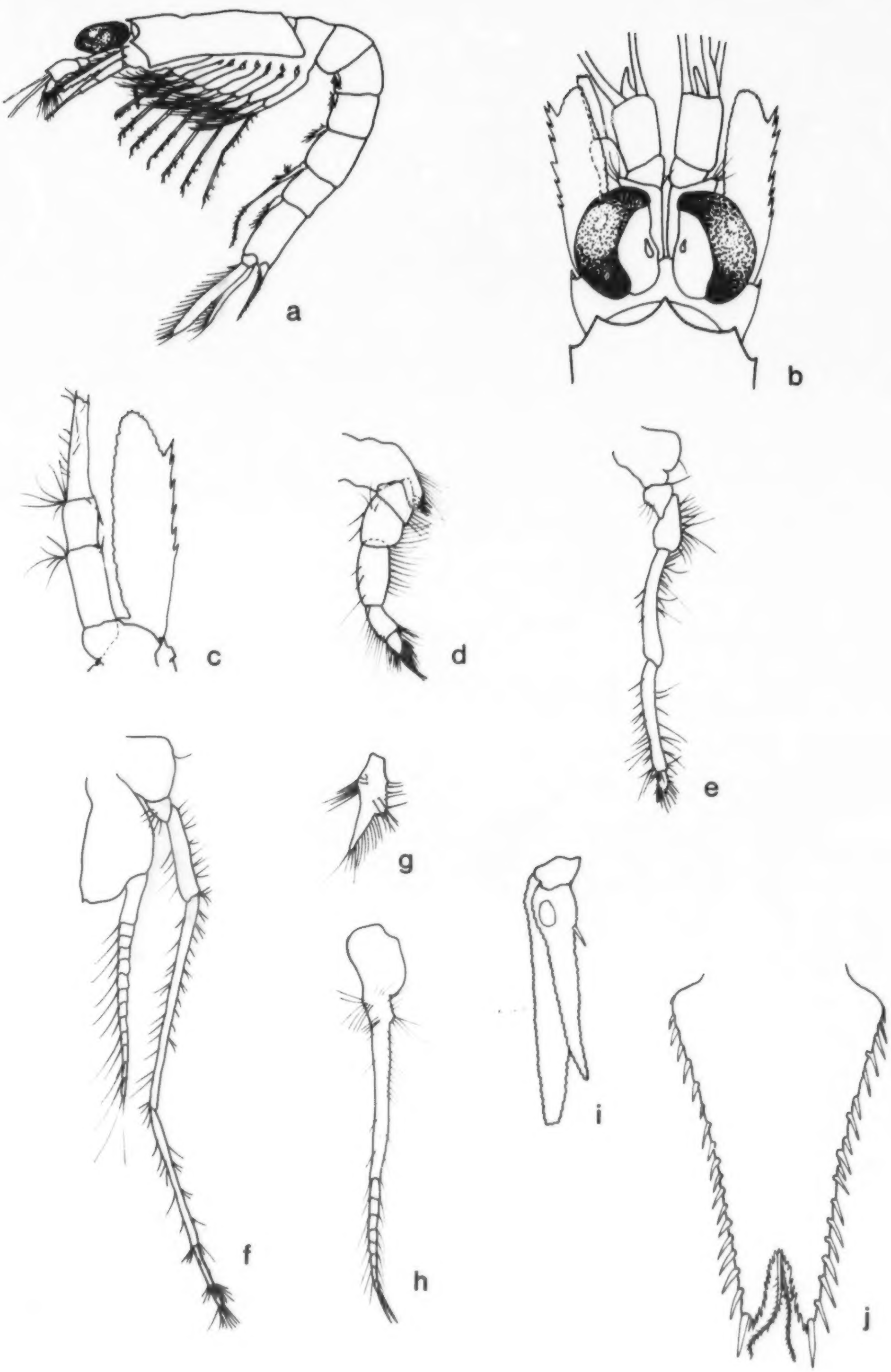
Telson. With cleft extending 1/7th to 1/5th length of telson such that inner apex is approximately opposite the 3rd spine on each lateral margin of telson; with 12-13 (British Columbia material) or 10 (NW Pacific material) spines on each side of cleft.

Size. 9-11 mm (British Columbia); >18 mm (NW Pacific).

TAXONOMIC NOTES A form from southern California is regarded as distinct (I. californica) by (5) but, at least for the present, as within the range of variability of I. insolita by (1). Specimens from British Columbia populations are similar to the NW Pacific form in the depth of the telson cleft but to the southern California form in number of teeth within the cleft, in size of adult individuals, and in number of teeth on the antennal scale.

DISTRIBUTION In NE Pacific from Bering Sea and British Columbia; 55-200 m; if I. californica proves to be same species then distribution extends south to southern California at 100 m.

Figure. a. lateral view, male (2); b. dorsal view, anterior end (2); c. antenna (1) (note that (2) and (6) draw 8 outer spines); d. 1st thoracopod (2); e. 2nd thoracopod (2); f. posterior thoracopod (2); g. 3rd male pleopod (2); h. 4th male pleopod (2); i. uropod (7); j. telson (1).


a
b
c
d
e
f
g
h
i
j

Inusitatomysis insolita

Meterythrops Smith, 1879

Meterythrops Smith, 1879
Banner, 1948a (1)
Ii, 1964 (2)
Mauchline, 1980 (3)
Murano, 1977 (4)
Tattersall and Tattersall, 1951 (5)

CHARACTERIZATION (1, 2, 3, 4, 5)

Carapace. Not spinous; front margin evenly rounded.

Rostrum. Absent, or short and rounded.

Antennules. Peduncle short, robust.

Antennal scale. Outer margin straight and smooth, terminating in single tooth, or with series of teeth.

Eyes. Well developed, with rounded cornea.

Mandibles. Normal cutting lobe, and well developed palps.

Labrum. Normal shape, rounded behind, symmetrical, no forward process.

Thoracopods. 2nd with short dactyl, a gnathopod; 3rd to 8th with propodus separated from carpus by oblique articulation; propodus 2 segmented plus short dactyl and long or short nail.

Oostegites. 3 pairs.

Abdomen. No pleura.

Pleopods. Rudimentary in females; in males exopod of 1st pleopod not rudimentary, several segmented and endopod 1 segmented; 2nd-5th biramous, natatory; endopod of 4th not elongated.

Uropods. Long and narrow, with or without spines on inner margin of endopod; well developed statocyst.

Telson. Long, triangular, no lateral spines; 2 pairs of apical spines, inner longer than outer; apical setae.

TAXONOMIC NOTES Key in (3) is incomplete as it does not separate Meterythrops from Katerythrops which has a much narrower antennal scale. Five known species (3), which are included in a key by (4).

Meterythrops robusta S.I. Smith, 1879

SYNONYMY AND REFERENCES

Meterythrops robusta S.I. Smith, 1879
Banner, 1948a (1)
Birstein and
 Tchindonova, 1958 (2)
Fulton, 1968 (3)
Mauchline and
 Murano, 1977 (4)
Murano, 1977 (5)
Nouvel, 1950 (6)
Shih et al., 1971 (7)
Taniguchi, 1969 (8)
W. Tattersall, 1933 (9)
W. Tattersall, 1951 (10)
Wailes, 1929
Wailes, 1933
Wigley and Burns, 1971 (11)
Zimmer, 1927

Parerthyrops robusta G.O. Sars, 1879 (12)
Zimmer, 1904

CHARACTERIZATION (1, 5, 6, 8)

Antennal scale. Single terminal tooth on smooth outer margin; distinct distal articulation.

Eyes. Large, more than 2X width of basal joint of antennular peduncle.

Uropods. Series of spines on inner margin of endopod.

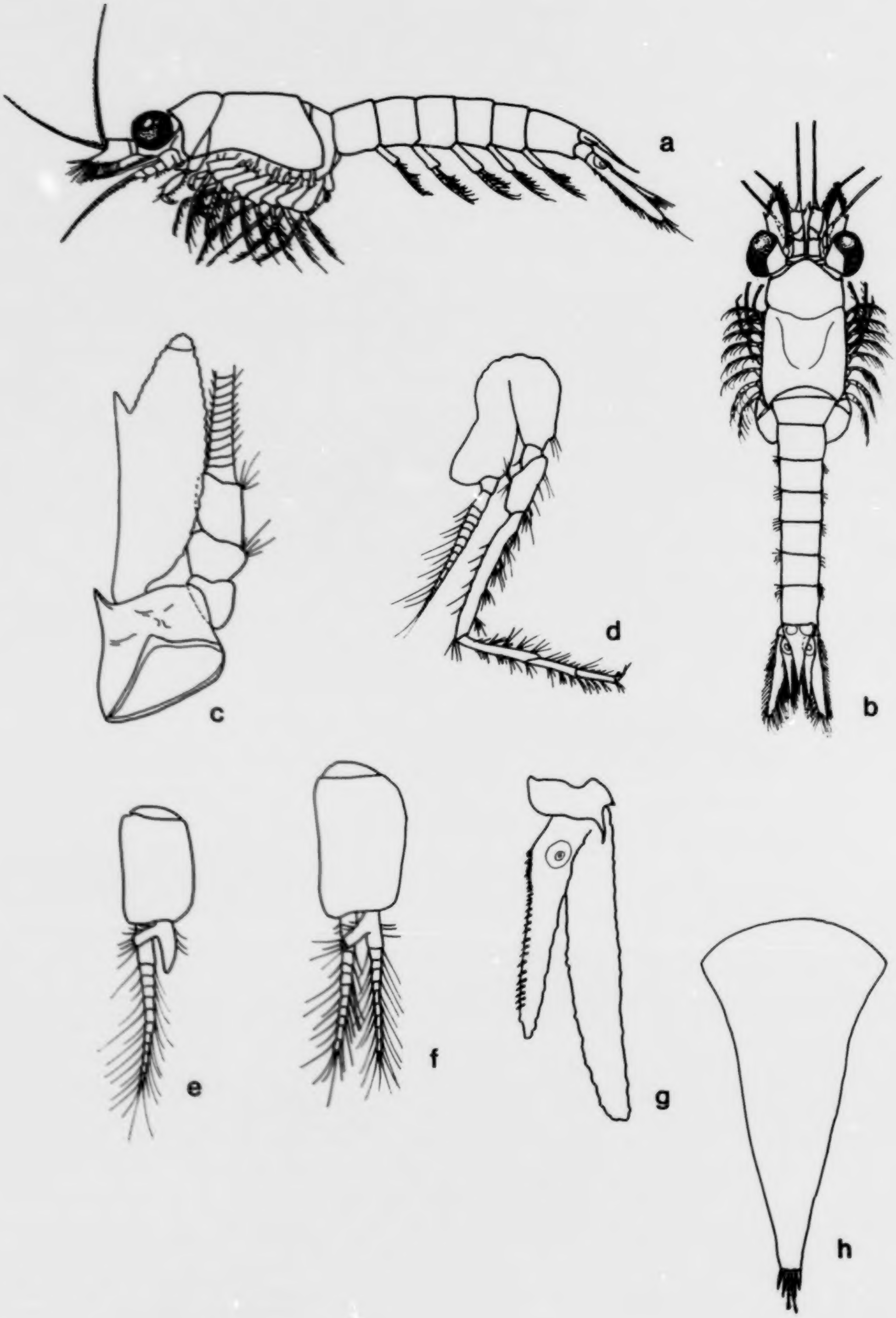
Size. 12-28 mm.

TAXONOMIC NOTES 5 recorded species (4, 5); *Meterythrops microphthalma* (10) from the NW Pacific was considered a synonymy of *M. robusta* by (1) on the basis of forms intermediate in eye size; however, (2) did not find intermediates in collections of both forms from the Kurile-Kamchatka region. The forms have been maintained as separate species by (5).

ECOLOGICAL NOTES Wigley and Burns (11) suggest this species lives on or just above the bottom based on limited sampling data.

DISTRIBUTION Polar and subpolar, mesopelagic in Atlantic and Pacific, 60-390 m (2, 4, 5, 8); in NE Pacific from Alaska to Washington (1, 3, 7, 9).

Figure. a. lateral view, male (12); b. dorsal view, female (12); c. antenna (12); d. 4th thoracopod (12); e. 1st male pleopod (12); f. 2nd male pleopod (12); g. uropod (12); h. telson (12).



Meterythrops robusta

Mysidella G.O. Sars, 1872

SYNONYMY AND REFERENCES

Banner, 1948b (1)
Ii, 1964 (2)
Mauchline, 1980 (3)
Mauchline and Murano, 1977 (4)
Murano, 1970 (5)
Tattersall and Tattersall, 1951 (6)

CHARACTERIZATION (1, 2, 3, 5, 6)

Rostrum. Short or absent.

Eyes. Variable.

Antennules. Male process of peduncle represented by a small setose lobe.

Antennal scale. Small, setose all around with rounded apex and small distal suture.

Labrum. Divided into 2 lobes by deep incision; produced posteriorly into a large plate; no anterior process.

Mandibles. Cutting lobe expanded; with straight edge and no teeth.

Maxillules. Outer lobe distally broadened with row of strong spines of increasing length; inner lobe with stout spinous setae.

Thoracopods. 1st with propodus expanded and armed with modified spines; 3rd-8th with propodus of endopod 2-3 segmented.

Oostegites. 3 pairs.

Penes. Long, forwardly directed.

Pleopods. Rudimentary in both sexes.

Uropods. Exopod undivided and setose all around.

Telson. With distal cleft.

TAXONOMIC NOTES Includes 6 species (3), 5 of which are included in a key by (5); the modified definition by (1) is unnecessary with the removal of Mysidella bulgarica from the genus (2).

Mysidella americana Banner, 1948

SYNONYMY AND REFERENCES

Mysidella americana Banner, 1948b (1)	
Banner, 1954	Mauchline and Murano, 1977
Gleye, 1981 (2)	Murano, 1970

CHARACTERIZATION (1, 2)

Rostrum. Apex rounded.

Eyes. Well developed, spherical cornea.

Maxillules. Inner lobe with 3 plumose setae; outer lobe with 18 spines.

Thoracopods. 1st with outer margin of propodus armed with 3 stout spines; 2nd, a gnathopod, with terminal segment short and flattened with short setae.

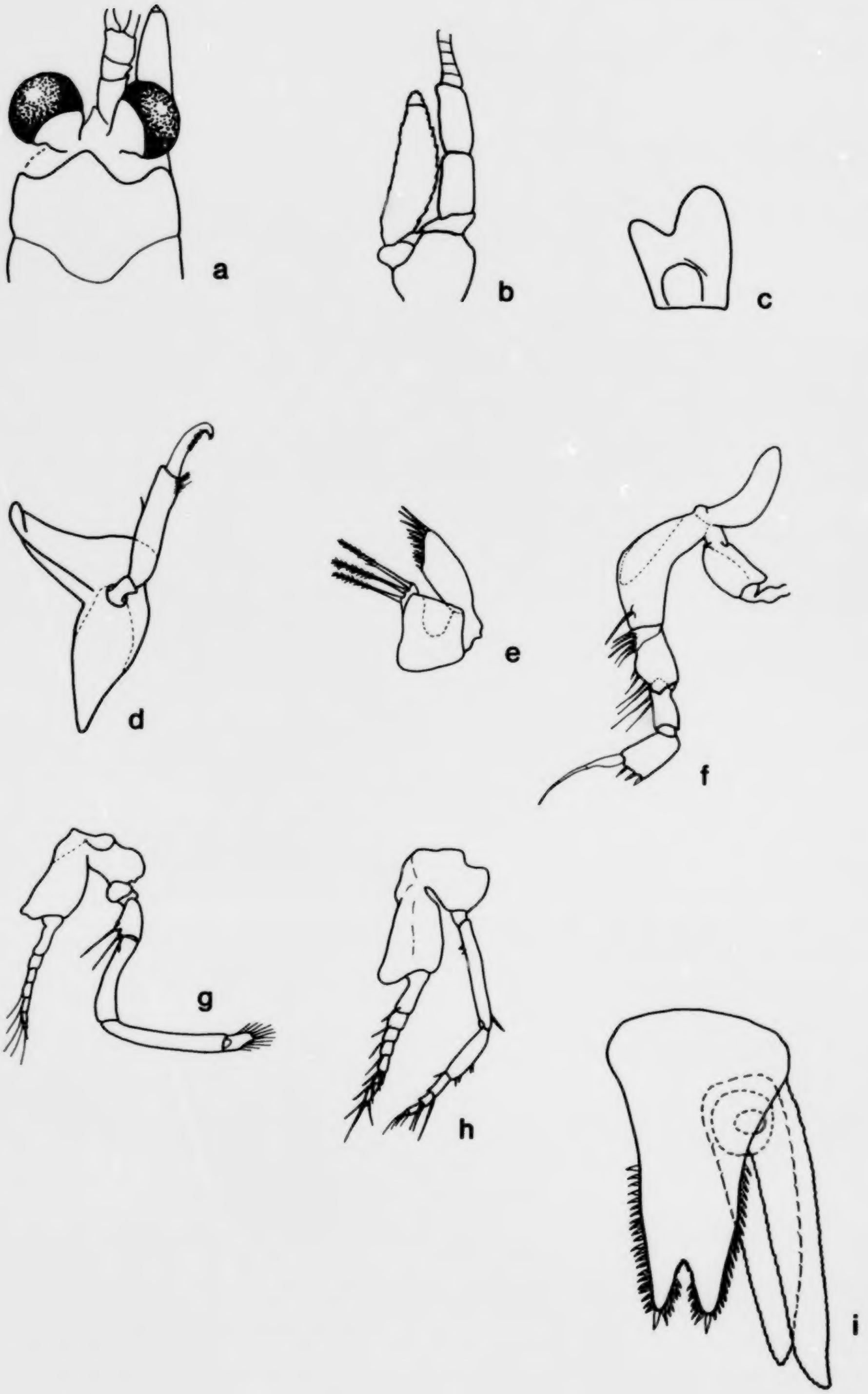
Telson. Concave margins; cleft 1/6 length of telson; 21-25 spines on lateral margin; in cleft, 4 unarticulated spines proximally, 6-7 articulated spines distally for a total of 10-11 on each margin; 1-2 pairs of terminal spines.

Size. 8 mm (based on 1 specimen).

TAXONOMIC NOTES Original description was in error, stating only distal 1/3 of antennal scale with setae; similar in many features to M. tanakai, but telson differing in shape and number of spines.

DISTRIBUTION British Columbia and southern California, but little data from intermediate localities; 35-500 m (1, 2).

Figure. a. dorsal view, anterior end; b. antenna (2); c. labrum (1); d. mandible and palp (1); e. maxillule (1); f. 1st thoracopod (1); g. 2nd thoracopod (1); h. 6th thoracopod; i. uropod and telson (2).



Mysidella americana

Mysis Latreille, 1803

SYNONYMY AND REFERENCES

Mysis Latreille, 1803
Holmquist, 1958 (1)
Mauchline, 1980 (2)
Tattersall and Tattersall, 1951 (3)
W. Tattersall, 1951 (4)
Zimmer, 1915 (5)

Michtheimysis Norman, 1902

Pugetomysis Banner, 1948b

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Anterolateral margins rounded; rostrum with concave margins, forming a right angle at the round apex.

Eyes. Normally developed with single approximately hemispherical cornea.

Antennular peduncle. No data on male.

Antennal scale. Setose all around; elongate, 4.5-9X as long as wide; apex pointed or rounded; distal suture present or absent.

Labrum. No frontal process.

Thoracopods. Endopod of 1st with gnathobasic lobes on 2nd, 3rd and 4th segments; 3rd-8th with carpo-propodus divided into many segments.

Oostegites. 2 ordinary pairs and 2 rudimentary pairs on 5th and 6th endopods; no baling lobes.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females; 1st, 2nd and 5th rudimentary in males, only unjointed plates except male 5th may be 2 segmented; 3rd male biramous, endopod unsegmented, exopod short, with 4-6 segments; 4th male very long, biramous, endopod 1-2 segmented, exopod 6-7 segmented, last and next to last segments each with long barbed seta which together form pincer or scissor-like termination.

Uropods. A few spines on lower inner margin of endopod adjacent to statocyst.

Telson. Elongate, almost quadranglar, apex cleft; cleft serrated; lateral margins with spines along full length.

TAXONOMIC NOTES Zimmer (5) and (3) broadly defined this genus to include forms with pointed antennal scale (Michtheimysis) as well as rounded antennal scale (Mysis in the restricted sense). Mauchline (2) has followed this broad definition and includes 12 species in the genus.

Mysis litoralis (Banner, 1948)

SYNONYMY AND REFERENCES

Pugetomysis litoralis Banner, 1948b (1)

Mysis litoralis
Banner, 1954d (2)
Geiger, 1969 (3)
Holmquist, 1958 (4)
Holmquist, 1959 (5)
Holmquist, 1982

Mysis oculata Authors in NE Pacific
Banner, 1954c (6)
Kozloff, 1974 (7)

CHARACTERIZATION (1, 4, 5)

Rostrum. Angular with fairly straight sides.

Antennal scale. Apex rounded; distal suture; length 5-5.5 times width.

Thoracopods. 2nd with barbed spines on distal ½ of terminal segment (vs. distal 4/5 in *M. oculata*); 3rd to 8th with carpo-propodus of endopod 5 segmented.

Pleopods. In immature males only 4th pleopod biramous, 3 segmented exopod shorter than endopod; only a papilla, not 2 long barbed setae, on exopod; in males over 19 mm the 4th pleopod extends beyond posterior edge of 6th abdominal segment.

Uropods. 4-8 spines on lower inner margin of endopod.

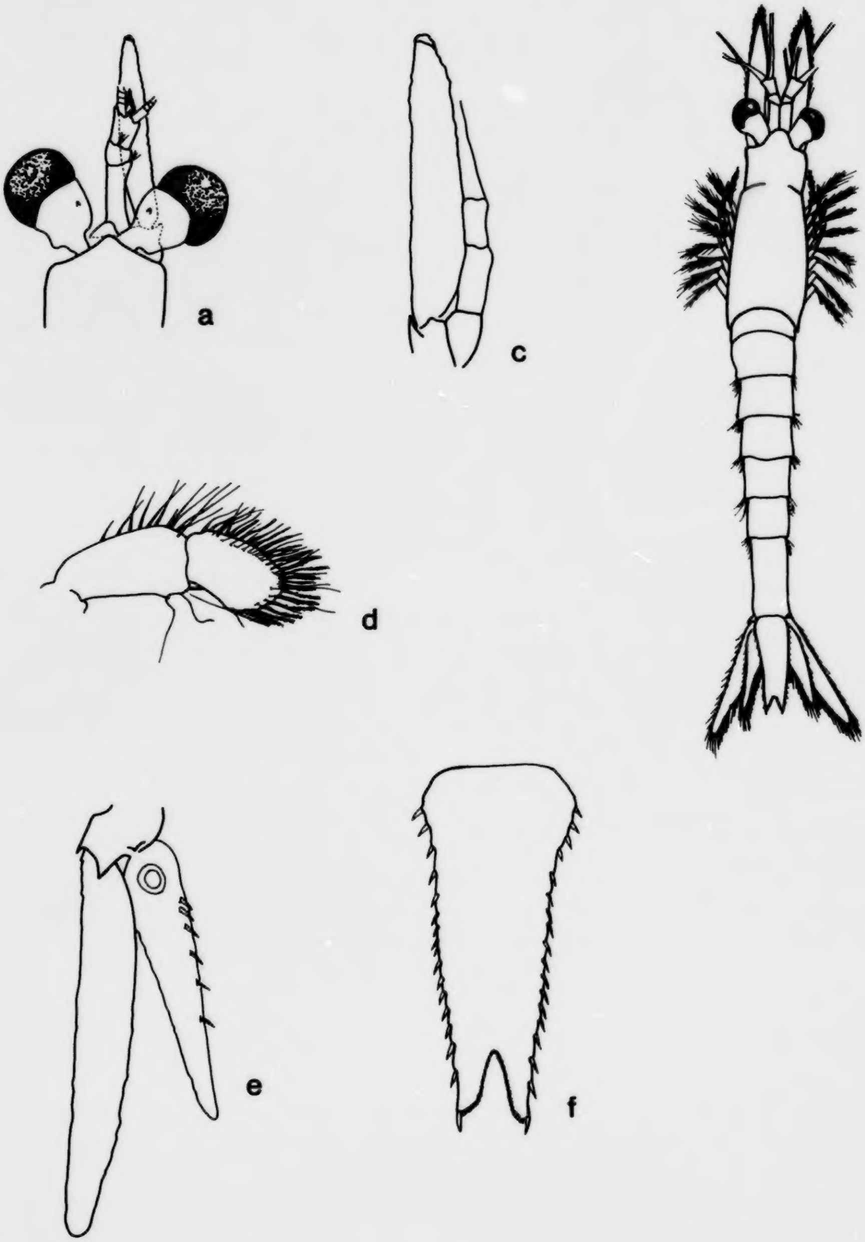
Telson. Up to 20 spines on each lateral margin; 1-3 (rarely 0, 4) of these distal of point opposite beginning of cleft (vs. 4-8 in *M. oculata* and fewer in small individuals); 1 apical spine on each side of cleft.

Size. 12-29 mm (15-28 in *M. oculata*).

TAXONOMIC NOTES Originally described as a new genus (1) but differences subsequently considered to be immaturity of specimens (2). However, there is no published information on mature males, which presumably have biramous pleopods. Holmquist (4) accepted placement in genus *Mysis* but maintained as separate species based primarily on differences in rostrum, armature of 1st thoracopod and telson. The figure by (1) of the rostrum of *M. litoralis* fits characterization for *M. oculata* by (4, 5); differences in spination of the 1st thoracopod are slight; the number of marginal spines opposite the telson cleft overlap in the 2 forms and are at least in part a function of size; and both forms may occur together in the same habitats. The case for maintaining separate species appears weak based on these characters.

DISTRIBUTION Circumpolar (3, 4, 5); in NE Pacific from Alaska and in Washington (6, 7).

Figure. a. dorsal view, anterior end (1); b. dorsal view (4); c. antenna (4); d. 2nd thoracopod, terminal segment of endopod (4); e. uropod (4); f. telson (4).



Mysis litoralis

Mysis relicta Loven, 1862

SYNONYMY AND REFERENCES

Mysis relicta Loven, 1862

Holmquist, 1959 (1)
Holmquist, 1963 (2)
Holmquist, 1966
Holmquist, 1973 (3)
Morgan (ed.), 1982
Nouvel, 1950
Pennak, 1978
Sparrow et al., 1964 (4)
Stringer, 1967 (5)
W. Tattersall, 1939b
W. Tattersall, 1951 (6)
Tattersall and Tattersall, 1951 (7)
Zimmer, 1933

Mysis oculata var. *relicta* Several authors

CHARACTERIZATION (1, 6, 7)

Carapace. Rostrum obtusely angular with rounded apex.

Antennal scale. Apex rounded; distal suture; length 4X width.

Thoracopods. 1st with prominent gnathobases; 2nd with barbed spines on dactyl; 3rd-8th carpo-propodus of endopod 6-7 segmented.

Pleopods. In males, exopod of 3rd 5 segmented; 4th may be very long in mature individuals extending to back of telson, exopod 7 segmented, barbed seta on penultimate segment longer than that on last segment and shorter in immature individuals.

Uropods. 4-5 spines on lower inner margin of endopod.

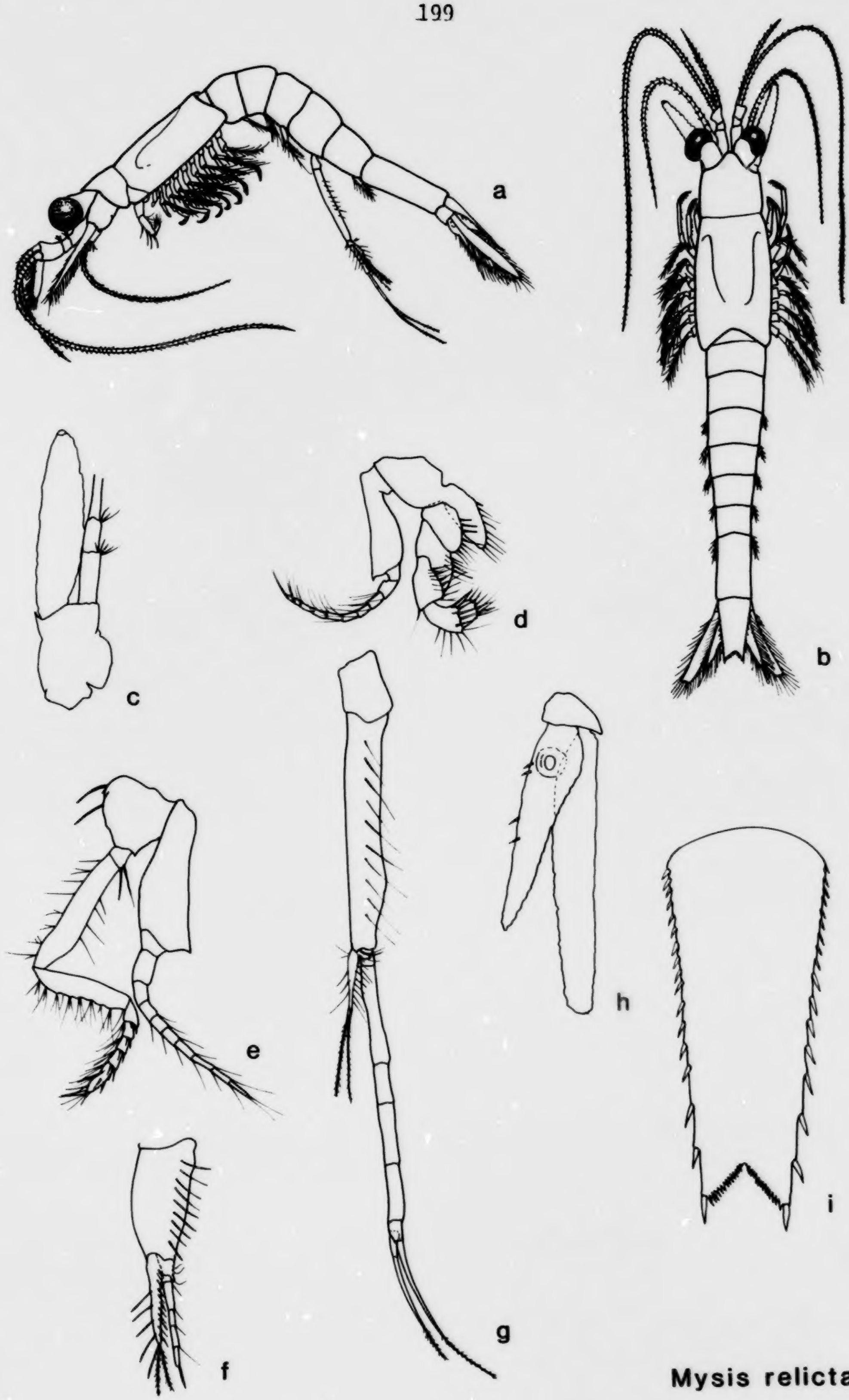
Telson. Up to 17-20 spines on each lateral margin; none of these distal of point opposite beginning of cleft other than 1 terminal pair; cleft with approximately straight sides forming right to obtuse angle.

Size. 15-18 mm.

TAXONOMIC NOTES Considered by some as a fresh water relict deriving from *M. oculata* or *M. litoralis* (1, 7). Holmquist (2, 3) reported co-occurrence with *M. litoralis* in some habitats without apparent intermediates. Morphological variation among these 3 species reported in detail by (1).

DISTRIBUTION Fresh waters in cold temperate regions of the northern hemisphere; nearshore marine and estuarine waters in northern Alaska, East Greenland and perhaps the Russian Arctic (1, 2, 3); locally, transplanted to several lakes in B.C. (4, 5).

Figure. a. lateral view, male (7); b. dorsal view, female (7); c. antenna (7); d. 1st thoracopod (7); e. 3rd thoracopod (7); f. 3rd male pleopod (7); g. 4th male pleopod (7); h. uropod (7); i. telson (7).



Mysis relicta

Neomysis Czerniavsky, 1882

SYNONYMY AND REFERENCES

Neomysis Czerniavsky, 1882

Banner, 1948b (1)	Ii, 1964 (2)
Holmquist, 1973	Mauchline, 1980 (3)

CHARACTERIZATION (1, 2, 3)

Carapace. Anterolateral margins pointed or rounded; rostrum variable, from rounded to pointed to angular.

Eyes. Normally developed with single approximately hemispherical cornea.

Antennal scale. Setose all around; elongate; apex pointed.

Thorax. Last 2-3 sterna with median fingerlike processes in breeding females.

Thoracopods. Endopod of 1st with gnathobasic lobes on 2nd, 3rd, and 4th segments; 3rd-8th with carpo-propodus many segmented.

Oostegites. 2 ordinary pairs and 1 rudimentary pair on 6th endopod or thoracopod in at least some species; anterior pair with baling lobe.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females, and 1st, 2nd, 3rd and 5th rudimentary in males, only unjointed plates; 4th male with unsegmented endopod and 2 segmented exopod terminating in 2 stout barbed filaments.

Uropods. Variable number of spines on lower inner margin of endopod adjacent to statocyst.

Telson. Elongated triangle, apex entire, rounded or truncate; lateral margins with spines along full length, 1 size class of spines.

TAXONOMIC NOTES Definition considerably restricted since 1951, resulting in many NE Pacific species being assigned to other genera; (3) includes 17 species within the genus.

Neomysis kadiakensis Ortmann, 1908

SYNONYMY AND REFERENCES

Neomysis kadiakensis Ortmann, 1908 (1)	
Banner, 1948b (2)	W. Tattersall, 1932 (5)
Banner, 1954c (3)	W. Tattersall, 1933 (6)
Banner, 1954d	W. Tattersall, 1951 (7)
Schmidt, 1919 (4)	

CHARACTERIZATION (1, 2, 3, 4, 5, 6, 7)

Carapace. Anterolateral margins pointed; rostrum variable, subquadrangular, rounded or obtusely angular.

Antennal scale. Length 12-14 times width.

Thoracopods. Carpo-propodus of endopod of 3rd-8th 8-12 segmented.

Pleopods. 4th male reaches to or beyond posterior end of last abdominal segment; distal segment of exopod ¼ to ½ length of proximal segment.

Uropods. Approximately 40 spines on lower inner margin of endopod.

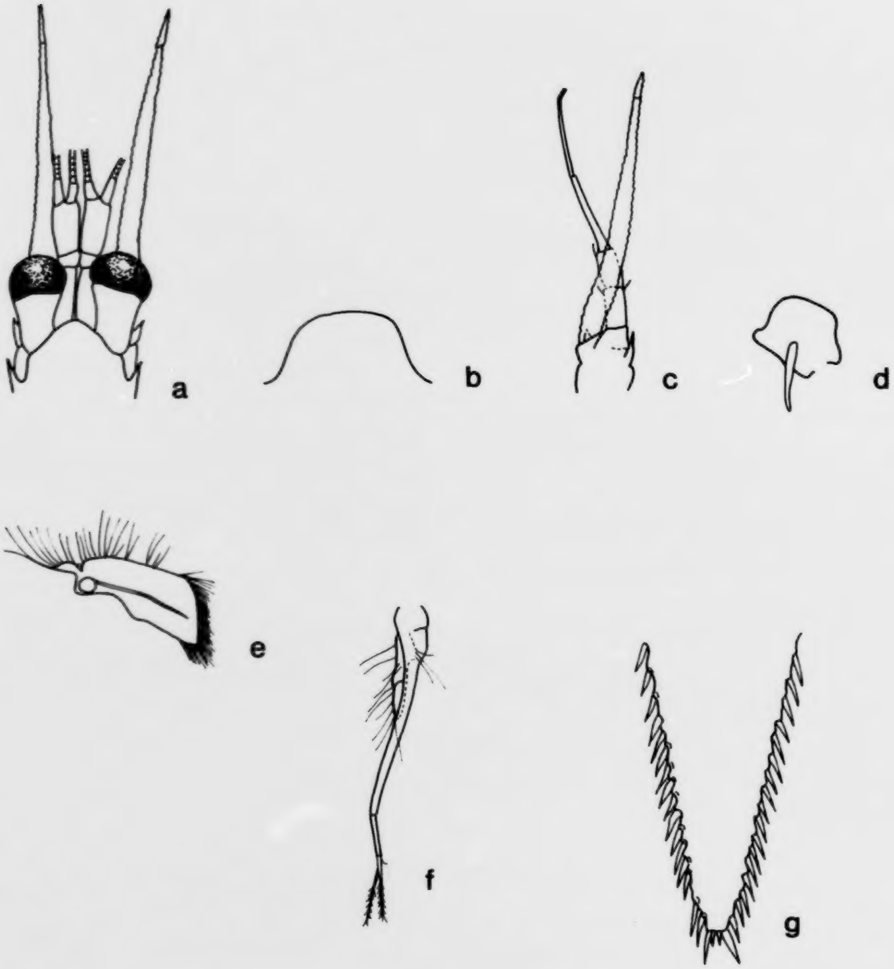
Telson. Length 2.5X basal width; apex narrow but truncate; 29-35 lateral spines on each side of which 20 are on distal half (L. Gleye, pers. comm.) and closely spaced such that space between is much less than spine length; spines on proximal half are not on edge and are difficult to count; apex with 1 pair of larger apical spines with 1 pair of short medial spines between.

Size. 20-23 mm.

TAXONOMIC NOTES Number of segments on carpo-propodus of thoracopods varies with size (2); considerable variation exists in relative lengths of proximal and distal segments of the exopod of 4th male pleopod.

DISTRIBUTION Southern Alaska to southern California, neritic to 200 m (2, 7).

Figure. a. dorsal view, anterior end (2); b. rostrum (5); c. antenna (5); d. fingerlike process on thoracic sternum (5); e. anterior oostegite with baler (posterior lobe) (5); f. 4th male pleopod (5); g. distal half of telson (4).



Neomysis kadiakensis

Neomysis mercedis Holmes, 1897

SYNONYMY AND REFERENCES

Neomysis mercedis Holmes, 1897 (1)
Banner, 1948b (2)
Banner, 1954d
Holmquist, 1973 (3)
Holmquist, 1982 (4)
Ii, 1964 (5)
Johnston and Lasenby, 1982 (6)
Orsi et al., 1979 (7)
Simenstad et al., 1980 (8)
Smith and Carlton, 1975
W. Tattersall, 1932 (9)
W. Tattersall, 1933 (10)
W. Tattersall, 1951 (11)

Neomysis awatschensis of authors in NE Pacific
Banner, 1954c (12)
Hair, 1971 (13)
Heuback, 1969 (14)
Kozloff, 1974 (15)
Turner and Hueback, 1966

Neomysis intermedia of Simons et al., 1974

CHARACTERIZATION (1, 2, 3, 10, 11)

Carapace. Anterolateral margins pointed; rostrum apex rounded.

Antennal scale. Length 8.9 times width.

Labrum. Anterior process short, broadly triangular with blunt point.

Thoracopods. Carpo-propodus of endopod on 1st-5th 5-8 segmented; on 6th 8-10 segmented.

Pleopods. 4th male reaches to distal half of last abdominal segment; endopod approximately 1/3 length of proximal segment of exopod but may vary with maturity.

Uropods. 20-30 spines on lower inner margin of endopod.

Telson. Length 1.8-1.9X basal width; apex truncate; 12-15 lateral spines with the distance between them equal to or greater than their length; 1 pair of larger apical spines with 1 pair of smaller medial spines between.

Color. Variable, including green and clear with black spots.

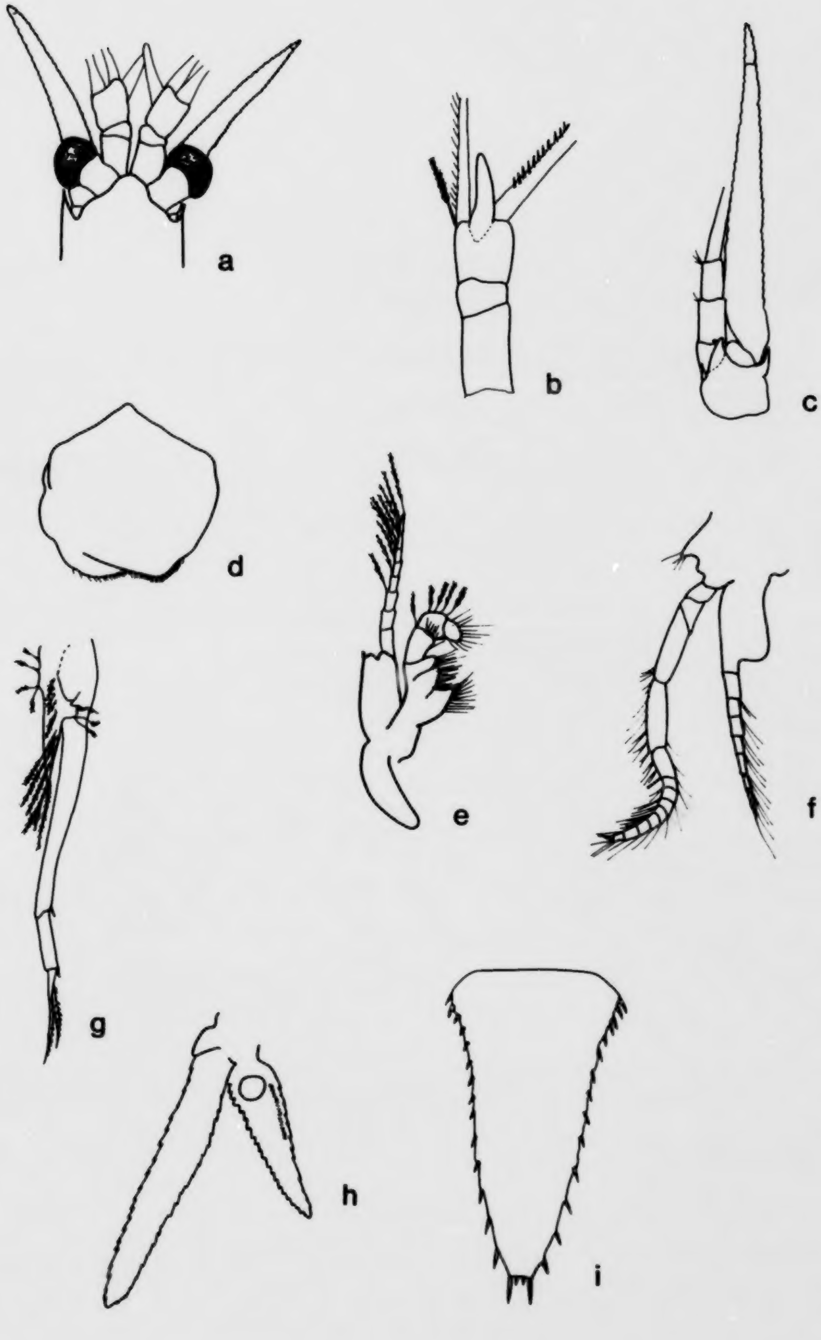
Size. 11-15 mm.

TAXONOMIC NOTES *N. mercedis* was synonymized with *N. awatschensis* and *N. intermedia* by (2) but has been considered distinct by (9, 10, 11, 12, 13 and at least from *N. awatschensis* by (5).

ECOLOGICAL NOTES Euryhaline, including rivers opening to salt water; and now isolated lakes; 1 of the most abundant mysid species in littoral waters of B.C. (1, 3, 4, 6, 13, 15).

DISTRIBUTION Southern Alaska to southern California, littoral and shallow neritic (3, 4, 7, 8).

Figure. a. dorsal view, anterior end (2); b. antennular peduncle (1); c. antenna (9); d. labrum (3); e. 1st thoracopod (2); f. 4th thoracopod (2); g. 4th male pleopod (9); h. uropod (2); i. telson (9).



Neomysis mercedis

Neomysis rayi (Murdoch, 1885)

SYNONYMY AND REFERENCES

Neomysis rayi (Murdoch, 1885a) (1)
Banner, 1948b (2)
Banner, 1954c (3)
Holmquist, 1982
Ii, 1964 (4)
Kozloff, 1974
Schmidt, 1919 (5)
W. Tattersall, 1932 (6)
W. Tattersall, 1933
W. Tattersall, 1951 (7)

Neomysis franciscorum (Holmes, 1900)
Hansen, 1913
W. Tattersall, 1932
W. Tattersall, 1933

Neomysis franciscana error for *franciscorum* of Schmitt, 1919

Neomysis toion Derzhavin, 1913

CHARACTERIZATION (1, 2, 4, 5, 6, 7)

Carapace. Anterolateral margins pointed; rostrum subquadrangular, may be distally depressed.

Antennal scale. Length 10-12 times width.

Labrum. Pointed anteriorly.

Thoracopods. Carpo-propodus of endopod of 3rd-8th 8-10 segmented in small specimens, but up to 22 segments in large specimens.

Pleopods. 4th male reaches to or beyond posterior end of last abdominal segment; distal segment of exopod 1/9 (small individual) to ½ (large individual) length of proximal segment.

Uropods. From 20 (small individual) to 56 (large individual) spines on lower inner margin of endopod.

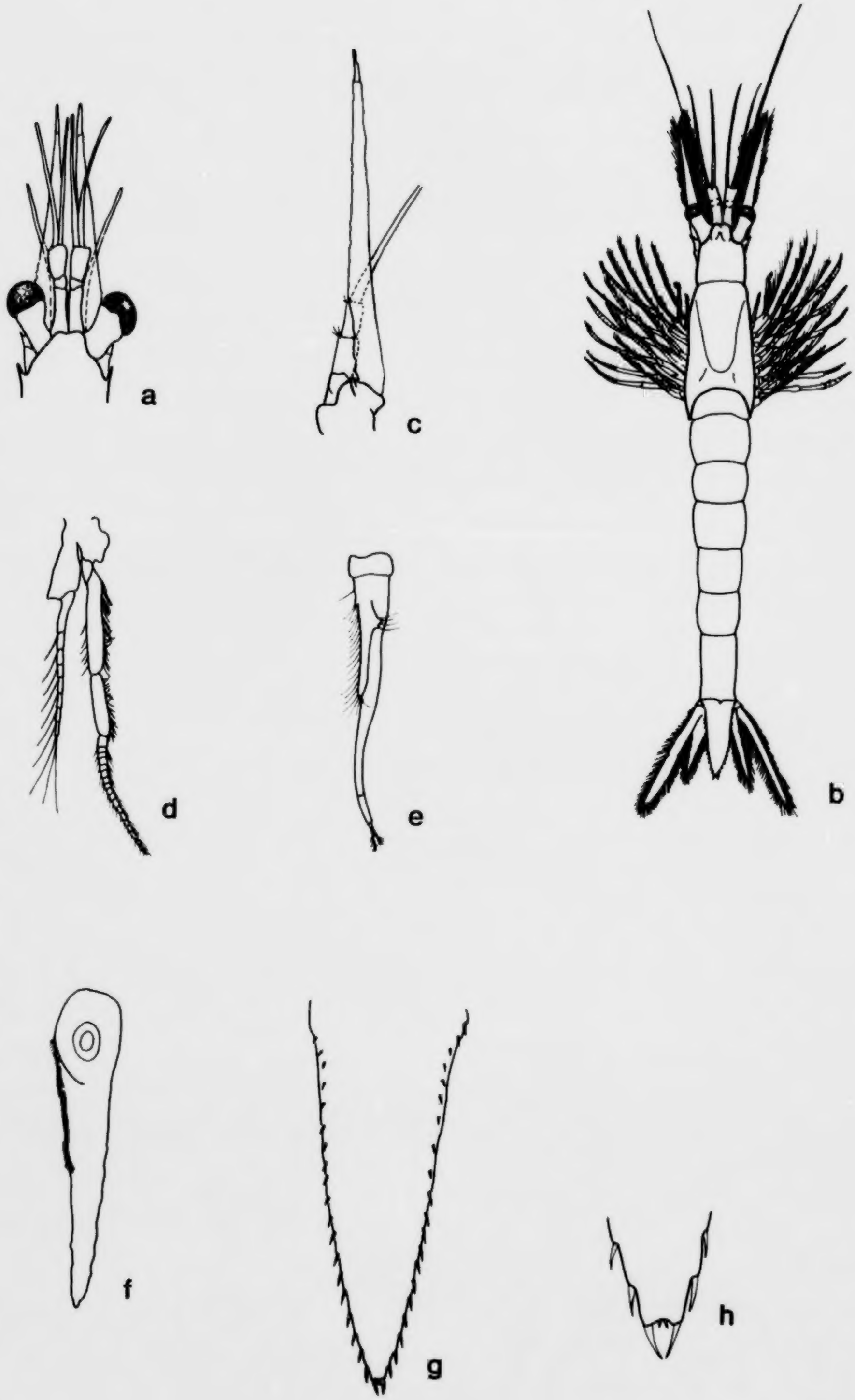
Telson. Length 2.5X basal width; apex narrow but truncate; up to 21-25 lateral spines on each side and widely spaced such that the space between each is greater than spine length; 1 pair of larger apical spines with 1 pair of shorter medial spines between.

Size. 18-65 mm.

TAXONOMIC NOTES Banner (2) examined a wide range of sizes and concluded that *N. franciscorum* was a synonym of *N. rayi*; (7) reached a similar conclusion. There may be seasonal variations in the size of mature individuals--small in summer, large at other times of the year.

DISTRIBUTION NW Pacific, Bering Strait and south to central California; neritic to 300 m (2, 3, 4, 7).

Figure. a. dorsal view, anterior end, female (4); b. dorsal view (1); c. antenna (7); d. posterior thoracopod (4); e. 4th male pleopod (7); f. endopod of uropod (4); g. telson (7); h. telson apex (4).



Neomysis rayi

Pacifacanthomysis Holmquist, 1981

SYNONYMY AND REFERENCES

Pacifacanthomysis Holmquist, 1981b (1)

Acanthomysis (in part) of authors

CHARACTERIZATION (1)

Carapace. Anterolateral margins rounded; rostrum with concave sides, forming a sharp, acute angle at apex.

Eyes. Normally developed.

Antennules. No knoblike processes in male.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed anterior process.

Thoracopods. Carpo-propodus divided into a few segments.

Oostegites. 2 ordinary pairs and 1 anterior rudimentary pair; 1 pair of hair tufts.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females, and all but 4th rudimentary in males, only unjointed plates; 4th with endopod less than ¼ length of slender exopod; exopod 2 segmented with distal segment short, <¼ of proximal; 2 long terminal barbed setae.

Uropods. Several spines on lower inner margin of endopod adjacent to statocyst.

Telson. Narrow triangle with rounded apex; large and small lateral spines full length of margins, tendency to size grouping distally; size increases from base to apex; apex with 1 pair of large spines separated by 1 pair of small medial spines.

TAXONOMIC NOTES Under the above narrow definition of the genus only 1 species is known. The characters noted by (1) which separate this species from others of *Acanthomysis* might be regarded as of only specific rather than generic value by others and if similar values were applied to other species many additional genera would be required. Holmquist's evaluation is here maintained pending recommendations by other specialists in the group.

Pacifacanthomysis nephrophthalma Holmquist, 1981

SYNONYMY AND REFERENCES

Acanthomysis nephrophthalma Banner, 1948b (1)
Banner, 1954d
Gleye, 1981 (2)
Kozloff, 1974

Pacifacanthomysis nephrophthalma
Holmquist, 1981b (3)
Holmquist, 1982 (4)

CHARACTERIZATION (1, 3)

Eyes. Cornea kidney shaped in dorsal view, oval in lateral view; stalk with dorso-medial papilla. Black.

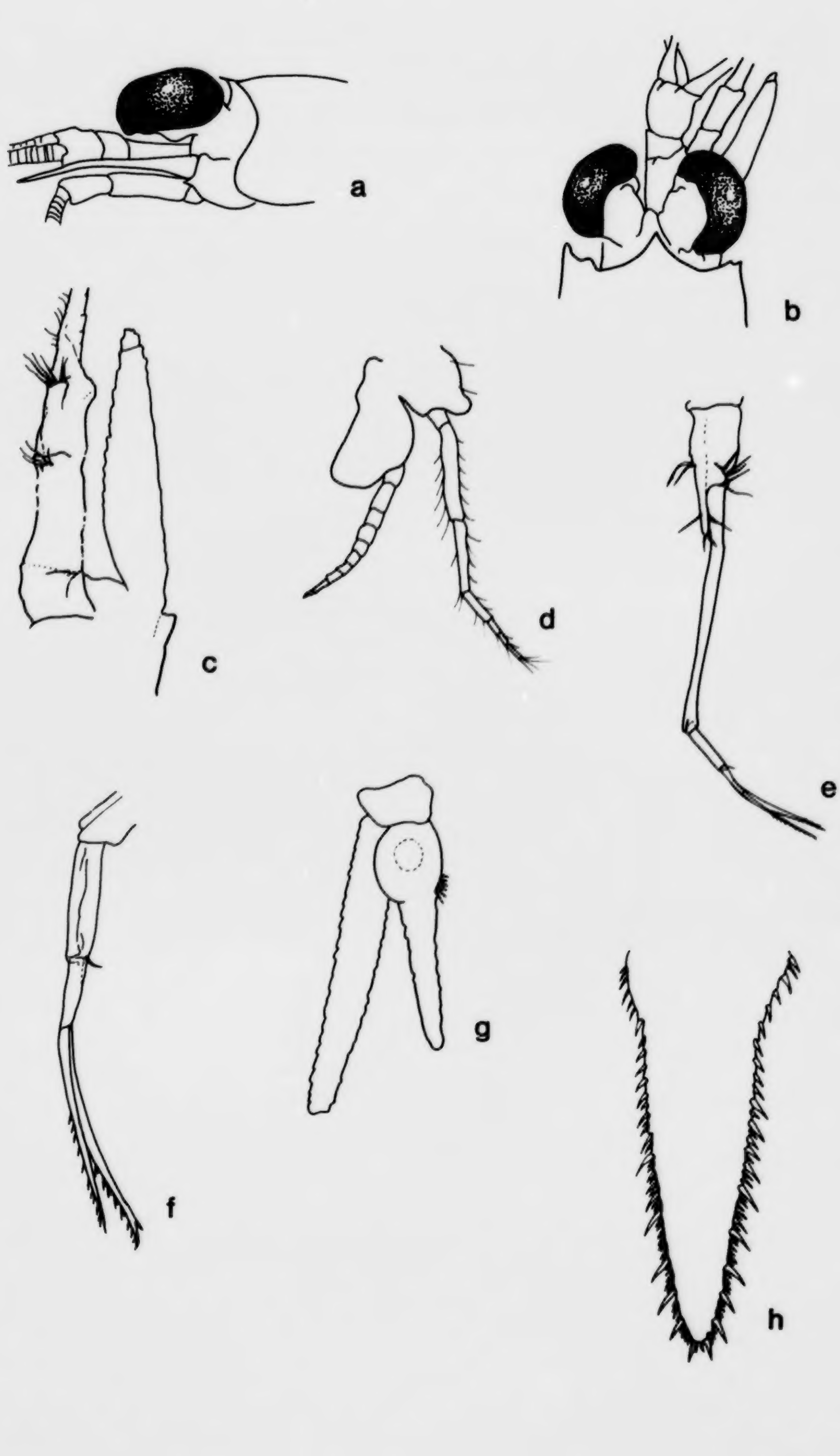
Antennal scale. Length 5 times breadth; extends just beyond antennal peduncle.

Thoracopods. 3rd-7th with 4 segments on carpo-propodus of endopod, 8th with 5 segments.

Uropods. 6-7 spines on lower inner margin of endopod adjacent to statocyst.

DISTRIBUTION Southern Alaska to southern California, 30 m, epibenthic (1, 2, 3).

Figure. a. lateral view, anterior end (1); b. dorsal view, anterior end (1); c. antenna (3); d. 4th thoracopod (1); e. 4th male pleopod (3); f. 4th male pleopod, distal portion (3); g. uropod (1); h. telson (3).



Pacifacanthomysis nephrophthalma

Petalophthalmus Willemoes-Suhm, 1875

SYNONYMY AND REFERENCES

Petalophthalmus Willemoes-Suhm, 1875 (1)
Mauchline, 1980 (2)
Tattersall and Tattersall, 1951 (3)
O. Tattersall, 1968

CHARACTERIZATION (1, 2, 3)

Carapace. Short, leaving last two thoracic segments exposed.

Rostrum. Short, acute.

Antennules. Peduncle slender, about equal to carapace in length.

Antennal scale. Lanceolate, setose all around.

Mandibles. With long, powerful, prehensile palp; lacinia mobilis reduced.

Maxillae. With long spine at apex of endopod.

Thoracopods. 1st and 2nd shorter and thicker than remaining thoracopods; terminating in strong recurved spine or nail; epipod, no exopod. 5th-8th with long, slender endopods; no data on 3rd and 4th endopods.

Telson. Large, quadrangular; apex truncate, not cleft.

TAXONOMIC NOTES A small taxon with 3 known species; the long prehensile mandibular palp is unique among the mysids; the leaflike eyestalk in *P. armiger* is not characteristic of the genus.

Petalophthalmus armiger Willemoes-Suhm, 1875

SYNONYMY AND REFERENCES

Petalophthalmus armiger Willemoes-Suhm, 1875 (1)
Birstein and Tchindonova, 1958 (2)
Faxon, 1893 (3)
Mauchline, 1980 (4)
Nouvel, 1950
G.O. Sars, 1885a (5)
W. Tattersall, 1951 (6)
Tattersall and Tattersall, 1951 (7)
Zimmer, 1909

Petalophthalmus pacificus Faxon, 1893
Faxon, 1895 (8)

CHARACTERIZATION (3, 4, 5, 6, 7, 8)

Eyes. Leaflike eyestalk; blond.

Pleopods. Uniramous in female; biramous in mature male, but may be uniramous when immature.

Telson. Apex truncate or only slightly emarginate; apex with 3-5 barbed spines separated on each side of a medium barbed spine by 5 small spinules.

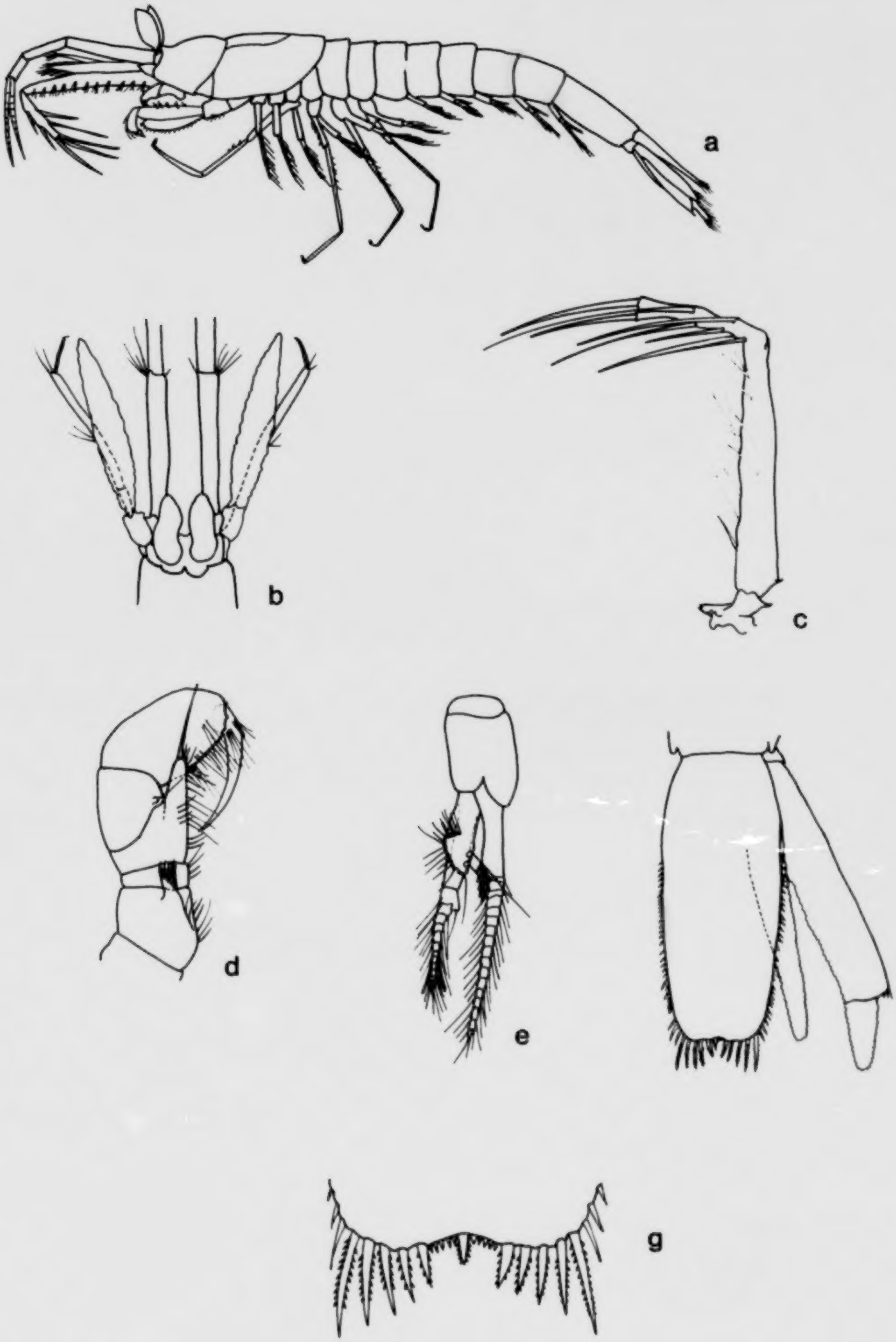
Size. 35-50 mm.

Color. No data.

TAXONOMIC NOTES G.O. Sars' (5) description was based on an immature form; he was in error in stating that an epipod is absent on the 1st thoracopod; the female described by (1) is another species.

DISTRIBUTION Atlantic, Indian and Pacific; bathypelagic, 900-4500 m (1, 2, 7); in NE Pacific recorded in Bering Sea, and central California south (3, 6). Rarely taken.

Figure. a. lateral view, immature male (5); b. dorsal view, anterior end (7); c. mandible and palp (4); d. 2nd thoracopod (7); e. 3rd male pleopod (7); f. telson and uropod (7); g. detail of telson apex (7).



Petalophthalmus armiger

Proneomysis W. Tattersall, 1933

SYNONYMY AND REFERENCES

Genus Proneomysis W. Tattersall, 1933 (1)
Banner, 1948b (2)
Holmquist, 1982 (3)
Ii, 1964 (4)
Mauchline, 1980 (5)
Murano, 1977 (6)

CHARACTERIZATION (1, 2, 3, 4, 5)

Carapace. Anterolateral margins acute or subacute (restricted definition); rostrum with straight margins, forming a right angle at the pointed apex.

Eyes. Normally developed with single approximately hemispherical cornea.

Antennal scale. Setose all around; rounded; distal suture present.

Labrum. Acute frontal process.

Thoracopods. Carpo-propodus of endopods 5 segmented (restricted definition).

Oostegites. 2 posterior and 2 rudimentary pairs on 5th and 6th thoracopods; 2 hair tufts on 3rd and 4th thoracopods; no baling lobes (restricted definition).

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females, and 1st, 2nd, and 3rd rudimentary in males, only unjointed plates; 4th male with endopod < ¼ length of exopod; exopod with 3 segments terminating in 2 long barbed setae; 5th male with elongated protopod subequal in length to 4th exopod; terminating in smooth seta 2X protopod length and extending back beyond uropod (restricted definition).

Uropods. A few spines on lower inner margin of endopod adjacent to statocyst.

Telson. Linguiform, with marginal spines along distal ½, increasing in length toward apex.

TAXONOMIC NOTES The genus as generally defined (1, 2, 4) includes 14 species (5, 6); however, (3) has restricted the definition (including, but not limited to, those characters noted above) such that, at present, only the type species P. wailesi is a member.

Proneomysis wailesi W. Tattersall, 1933

SYNONYMY AND REFERENCES

Proneomysis wailesi W. Tattersall, 1933 (1)
Banner, 1948b (2)
Banner, 1954d
Holmquist, 1982 (3)
Ii, 1964
W. Tattersall, 1951 (4)

CHARACTERIZATION (1, 2, 3, 4)

Antennal scale. Length 5 times breadth; slightly longer than peduncle in male (relatively longer in female).

Pleopods. 2 distal segments of exopod each about 1/8 length of proximal segment.

Uropods. 2-3 spines on lower inner margin of endopod.

Telson. Length 2 times basal width; on each side about 25 marginal spines, 1-2 small between each 2 larger spines, apically 1 pair large spines with 1 pair small spines medially.

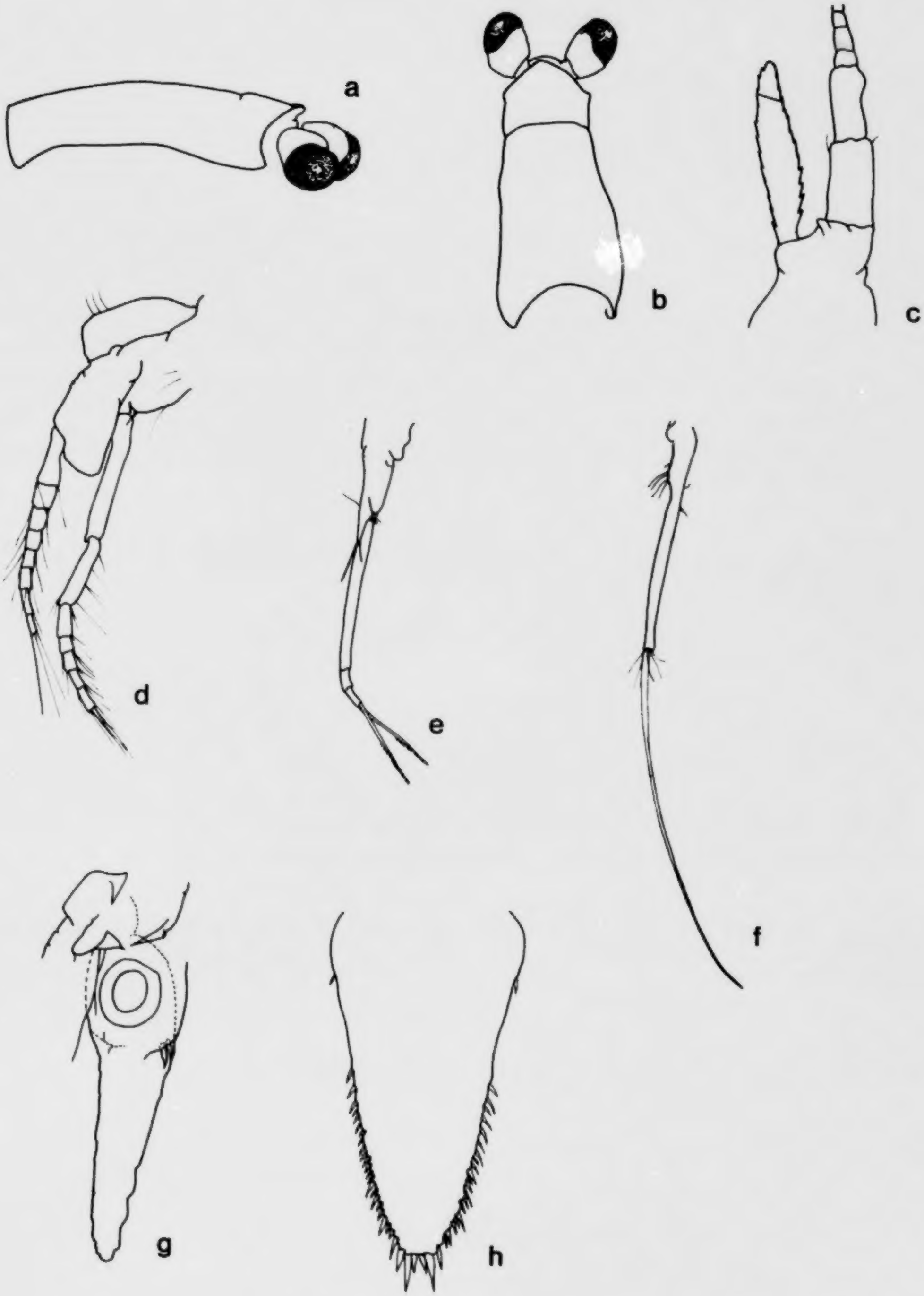
Color. Black cornea.

Size. 8 mm.

TAXONOMIC NOTES Material now at the California Academy of Sciences was identified as this species by W. Clarke. The label states that the specimens were collected from South Coronado Island, Baja California at 110 feet. Species characters fit those noted above except that the eyes are amber rather than black and the retinas are smaller for comparably sized animals from the Strait of Georgia, British Columbia.

DISTRIBUTION Alaska to Washington; Baja California; neritic, epibenthic, 3-46 m.

Figure. a. lateral view, anterior end (3); b. dorsal view, anterior end (3); c. antenna (1); d. 8th thoracopod (3); e. 4th male pleopod (1); f. 5th male pleopod (1); g. uropod (3); h. telson (3).



Proneomysis wailesi

Pseudomma G.O. Sars, 1870

SYNONYMY AND REFERENCES

Pseudomma G.O. Sars, 1870
Ii, 1964 (1)
Mauchline, 1980 (2)
Murano, 1974 (3)
Tattersall and Tattersall, 1951 (4)

CHARACTERIZATION (1, 2, 3, 4)

Carapace. Not spinous; front margin evenly rounded; rostrum absent.

Antennules. Short, thick peduncle.

Antennal scale. Outer margin smooth.

Eyes. No visual elements; no pigment; single, broad, flat plate; cleft at anterior margin, which is smooth or serrated but no pointed process on each anterolateral margin.

Mandibles. Normal cutting lobe; well developed palp.

Labrum. Normal shape, rounded behind, symmetrical, no forward process.

Thoracopods. 2nd with short dactyl, a gnathopod; 3rd-8th with 2 segmented propodus separated from carpus by oblique articulation.

Oostegites. 3 pairs.

Abdomen. No pleura.

Pleopods. Rudimentary in females; in males the exopod of the 1st pleopod has several segments and the endopod 1 segment; 2nd-5th biramous, natatory; endopod of 4th not longer than exopod.

Uropods. Long and narrow, with or without spines on inner margin of endopod; well developed statocyst.

Telson. Linguiform, 1 or more large spines at distal margin; lateral spines present or absent.

Color. Reddish purple.

TAXONOMIC NOTES Mauchline (2) lists 34 species and (3) provides a key to known species. Ii (1) states that some species have a transverse articulation between the carpus and propodus.

DISTRIBUTION Despite lack of functional eyes, some species occur in depths of less than 100 m.

Pseudomma berkeleyi W. Tattersall, 1933

SYNONYMY AND REFERENCES

Pseudomma berkeleyi W. Tattersall, 1933 (1)
Banner, 1948a (2)
Murano, 1974 (3)
W. Tattersall, 1951 (4)

Pseudomma species
Esterly, 1914 (5)

CHARACTERIZATION (1, 2, 4)

Antennal scale. Extends about ¼ of its length beyond peduncle; length 3.5X breadth; rounded apex only slightly anterior to spine.

Eyes. Anterior margin with about 9 course teeth on each anterolateral corner.

Uropods. Exopod 1.5X length of telson.

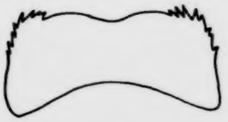
Telson. Apex rounded with 3 pairs of long spines subequal in length; pair of median plumose setae which, however, may be broken off; 3-4 minute and 1 larger lateral spines; the last is ½ the length of the adjacent apical spine.

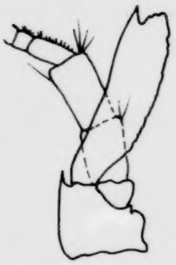
Size. 8 mm.

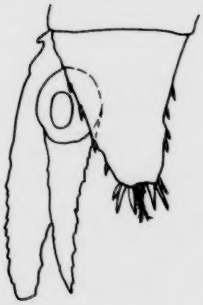
TAXONOMIC NOTES *Pseudomma* species of (5) may be this species but material is too damaged to establish affinity. Murano (3) places this species in the "*affine*" group within the genus. Original drawing is from specimen from San Miguel Island, California, in the Allan Hancock Foundation series.

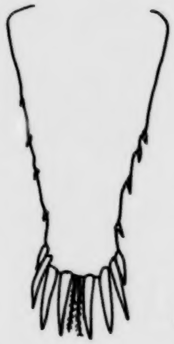
DISTRIBUTION Only one specimen known with certainty from this area; British Columbia; 120 m.

Figure. a. ocular plate (1); b. antenna (1); c. telson (1); d. uropod and telson (original, but possibly not *P. berkeleyi*).









Pseudomma berkeleyi

Pseudomma truncatum S.I. Smith, 1879 of Banner, 1948

SYNONYMY AND REFERENCES

Pseudomma truncatum of Banner, 1948a (1)
Birstein and Tchindonova, 1958? (2)
Fulton, 1968? (3)
Richters, 1884? (4)
W. Tattersall, 1933 (in part) (5)
W. Tattersall, 1951 in part? (6)
Wailes, 1929? (7)
Wailes, 1933? (8)

Pseudomma species of Holmquist, 1982 (9)

Non Pseudomma truncatum S.I. Smith, 1879 (10) *sensu strictu*
Murano, 1974 (11)
Nouvel, 1950 (12)
G.O. Sars, 1879 (13)
Zimmer, 1909 (14)

CHARACTERIZATION (1, 5, 9)

Antennal scale. Length 3 times breadth; rounded apex extends 1/3 of scale length beyond spine.

Eyes. Anterior margin smooth (fine serrations in some); overall form varies from rectangular to ovoid.

Telson. Apex truncate with 2 pairs of long spines subequal in length; pair of median plumose setae which may be broken; 4-8 shorter lateral spines.

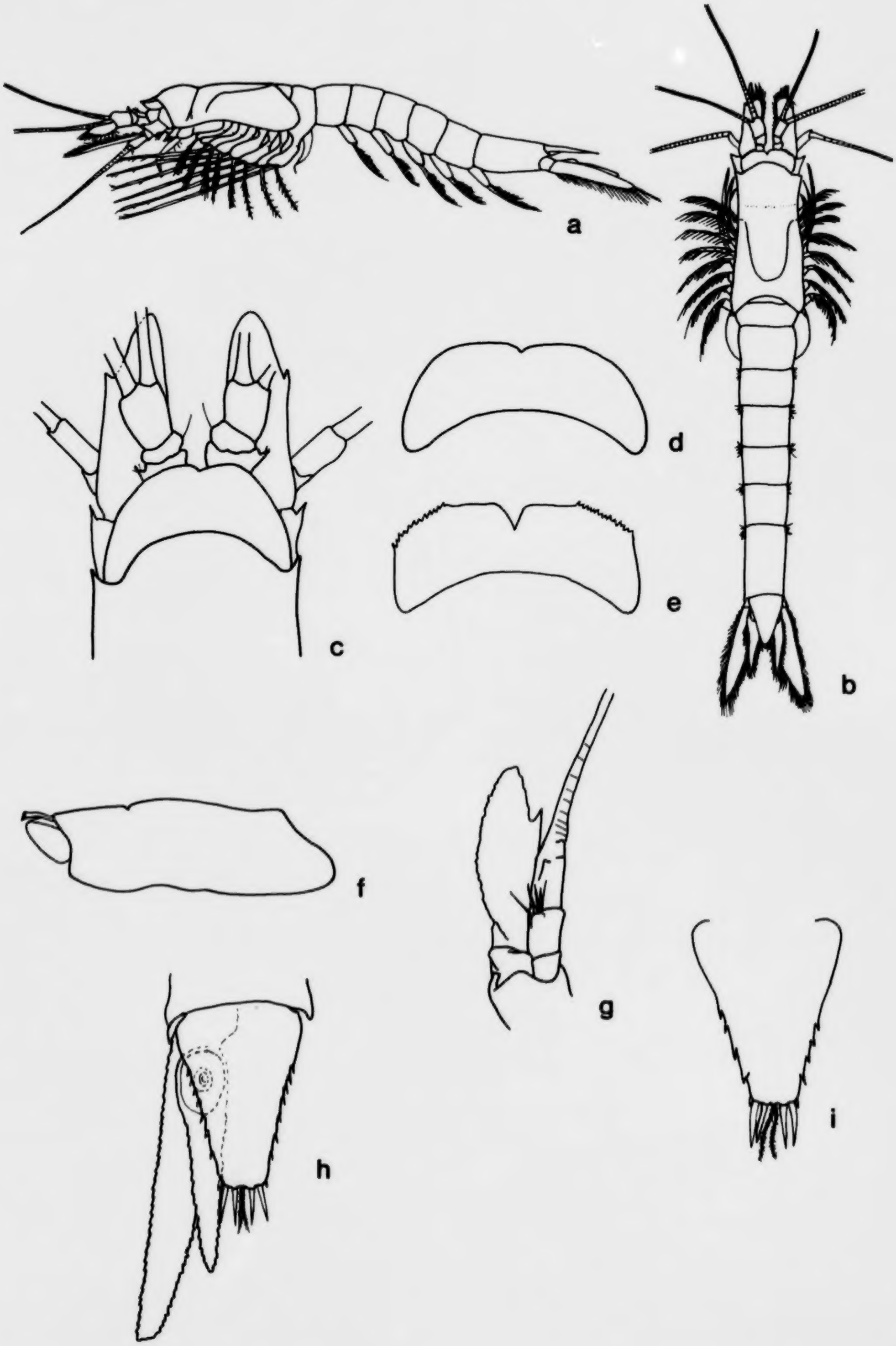
Size. 15 mm.

TAXONOMIC NOTES The specimens collected in the NE Pacific have variously been recorded as P. truncatum (1, 3, 4, 7, 8); as a possible variety of P. truncatum (3); and as a possible new species (9). The ovoid, smooth ocular plate noted by some in NE Pacific specimens (1, 5, 9) differs from descriptions and figures for Atlantic specimens (10, 11, 12, 13, 14). However, (5) found forms otherwise fitting P. truncatum both with and without ocular plate serrations in British Columbia. Differences in this character are generally regarded as significant at the specific level (11). Additional material is required to assess the taxonomic status of North Pacific populations. We used a specimen borrowed from K. Li for our drawing.

DISTRIBUTION P. truncatum *sensu strictu* northern north Atlantic and adjacent Arctic (2); P. truncatum form of Banner in NE Pacific from southern Alaska to Washington; 100-140 m (1, 5). Unspecified forms from Bering Sea and NW Pacific (2, 4).

Figure. a. lateral view, male (12, 13); b. dorsal view, female (12, 13); c. dorsal view, anterior end* (1); d. ocular plate* (original); e. ocular plate (13, 14); f. lateral view, anterior end* (9); g. antenna* (9); h. telson and uropods (12, 13); i. telson* (9).

*Denotes Pacific specimens; all others are Atlantic.



Pseudomma truncatum

Stilomysis Norman, 1892

SYNONYMY AND REFERENCES

Stilomysis Norman, 1892
Banner, 1948b (1)
Ii, 1964 (2)
Mauchline, 1980 (3)

CHARACTERIZATION (1, 2, 3)

Carapace. Anterolateral margins round; rostrum with concave sides meeting at right angles to form rounded apex.

Eyes. Normally developed with single approximately hemispherical cornea.

Antennal scale. Setose all around; rounded; distal suture present.

Oostegites. 3 pairs.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females, and 1st, 2nd, and 5th rudimentary in males, only unjointed plates; 3rd male unsegmented endopod and 4 segmented exopod with 2 short terminal setae; 4th male unsegmented endopod <¼ length of exopod with 5(4?) segments, each with spinose seta.

Uropods. Many spines on lower inner margin of endopod.

Telson. Narrow triangle, narrowly truncate at apex; large and small lateral spines full length of margins with tendency to size grouping distally; no marked increase in size from base to apex; apex with 1 large pair of spines and 1 small pair between.

TAXONOMIC NOTES Mauchline (3) lists 3 species. Ii (2) questions whether the terminal segment on the exopod of 4th male pleopod might not be the short basal segment of a jointed seta, in which case the exopod would be considered to have 4 rather than 5 segments.

Stilomysis grandis (Goes, 1863)

SYNONYMY AND REFERENCES

Mysis grandis Goes, 1863

Mysideis grandis by Sars, 1879 (1)

Stilomysis grandis by Norman, 1892

Banner, 1948b (2)	W. Tattersall, 1933 (5)
Ii, 1964	W. Tattersall, 1951 (6)
Mauchline and Murano, 1977 (3)	Zimmer, 1904 (7)
Nouvel, 1950 (4)	Zimmer, 1909 (8)

CHARACTERIZATION (2, 5, 6, 7, 8)

Rostrum. Round, but with a spine protruding anteriorly from below the rostral plate.

Antennal scale. Length 6 times width; length 3X peduncle.

Labrum. Rounded anteriorly.

Uropods. More than 25 spines along full length of lower inner margin of endopod.

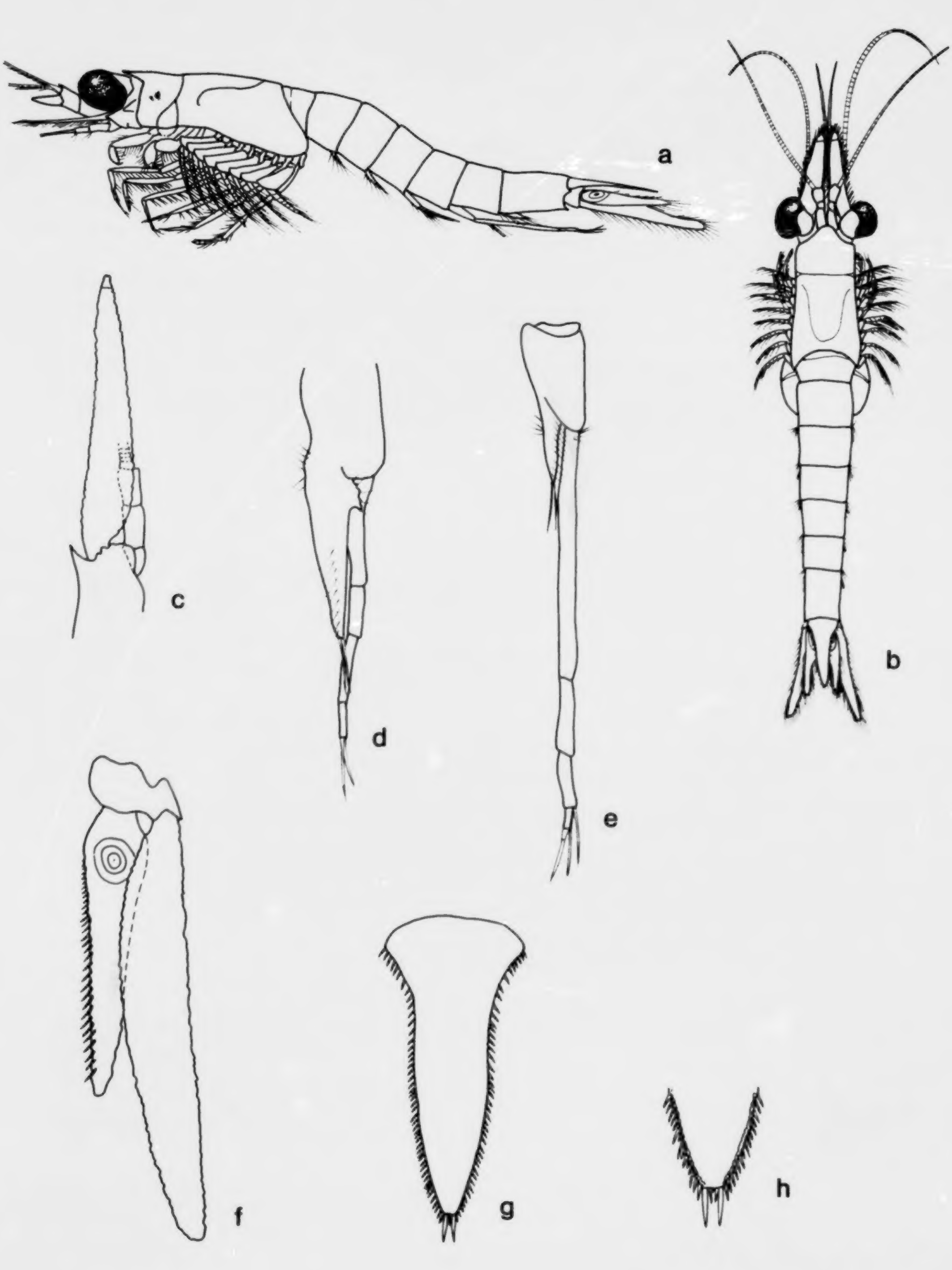
Telson. Approximately 45-60 spines on each margin, may be equal or unequal in size.

Size. 27-33+ mm (some are still immature at 33 mm).

Color. Eyes rust.

DISTRIBUTION Circumpolar, Arctic to cold boreal; 50-52 m (1, 2); in NE Pacific recorded from Howe Sound, B.C. (4) and Owen Point, Port of San Juan, B.C. (herein).

Figure. a. lateral view, male (1, 8); b. dorsal view, female (1, 8); c. antenna (1, 8); d. 3rd male pleopod (6); e. 4th male pleopod (6); f. uropod (1, 8); g. telson (1); h. telson apex (1).



Stilomysis grandis

Teraterythrops Ii, 1964

SYNONYMY AND REFERENCES

Teraterythrops Ii, 1964 (1)
Mauchline, 1980 (2)
Murano, 1975 (3)

CHARACTERIZATION (1, 2, 3)

Carapace. Not spinous; front margin evenly rounded; rostrum absent.

Antennules. Short, robust peduncle.

Antennal scale. Small, width less than or equal to width of antennal peduncle; length less than or equal to distal margin of antennular peduncle.

Eyes. Small, imperfectly developed.

Mandibles. Normal cutting lobe; well developed palp.

Labrum. Normal shape, rounded behind, symmetrical, no forward process.

Thoracopods. 2nd with short dactyl, a gnathopod; propodus of 3rd-8th separated from carpus by oblique articulation; propodus 2 segmented.

Oostegites. 2 pairs.

Abdomen. No pleura.

Pleopods. Rudimentary in females; in males the exopod of the 1st pleopod with several segments and endopod with 1 segment; 2nd-5th biramous, natatory; endopod of 4th not elongated.

Uropods. Well developed statocyst.

Telson. Short, triangular with truncate apex; apex with 1 pair of spines and 1 pair of plumose setae; 1 to a few spines on distal part of lateral margin, becoming longer distally.

TAXONOMIC NOTES Similar to Katerythrops in carapace form but easily differentiated by reduced eyes. Two species; keyed by (2).

Teraterythrops robusta (Birstein and Tchindonova, 1958)

SYNONYMY AND REFERENCES

Synerythrops robusta Birstein and Tchindonova, 1958 (1)

Teraterythrops tanakai Ii, 1964 (2)

Teraterythrops robusta of Murano, 1975 (3)

?Katerythrops species of Banner, 1948a (4)

CHARACTERIZATION (1, 2, 3)

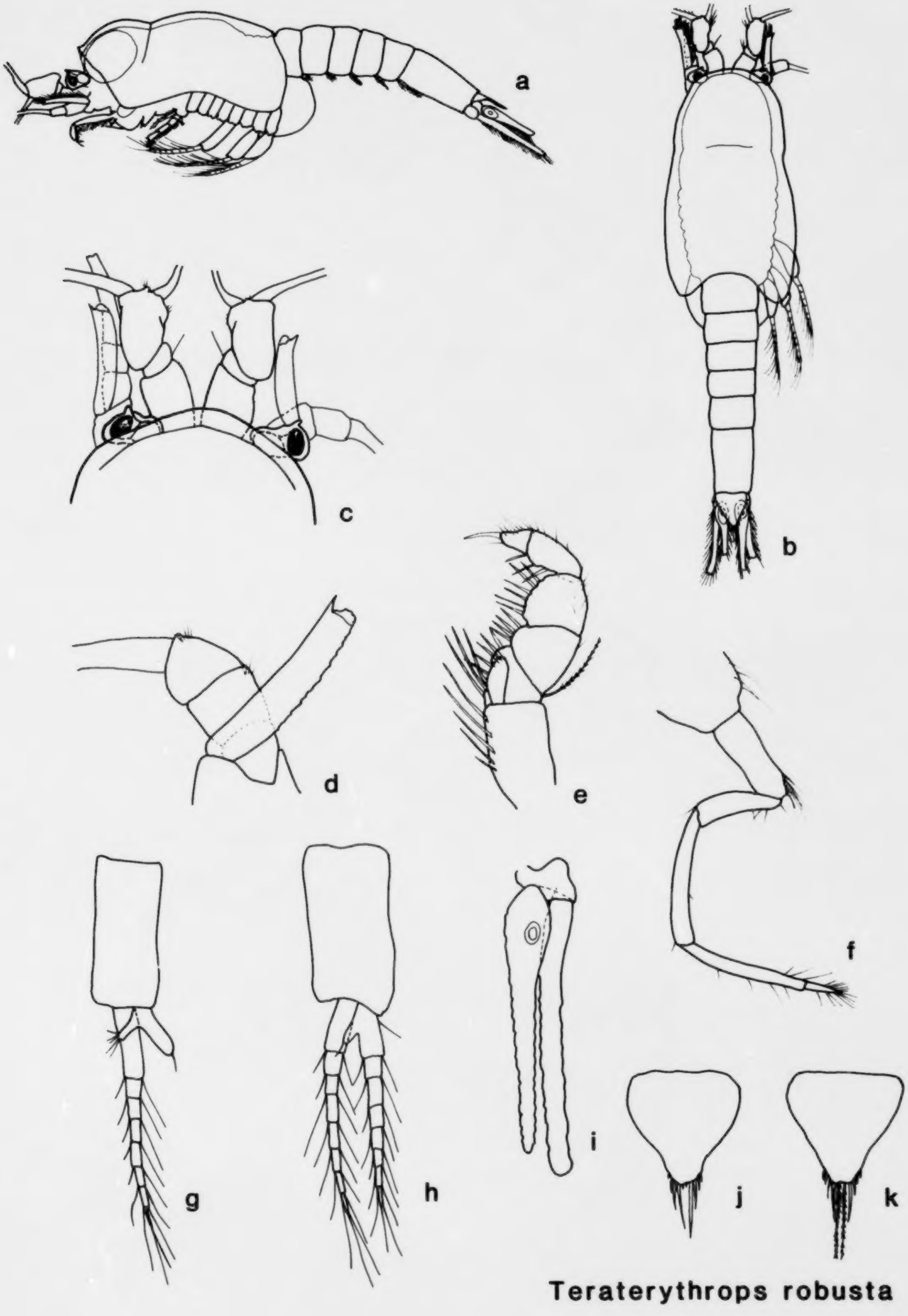
Antennal scale. Apical spine slightly longer than rounded portion of scale.

Telson. 3 spines on each lateral margin.

TAXONOMIC NOTES Form of the endopod of 3rd-8th thoracopods is uncertain. The apical setae on telson are easily lost and their length may vary. A damaged specimen from British Columbia was suggested by (4) to belong to the genus Katerythrops. Ii (2) noted that the presence of 4 pairs of spines, graduating in size toward the telson apex, together with a pair of plumose setae, fit the genus Teraterythrops. This character more particularly fits the description for T. robusta. However, (4) notes the undamaged eye was similar to Katerythrops oceanae which, while small, is not "imperfect" in appearance. More material is needed to establish the identity of the NE Pacific species.

DISTRIBUTION NW Pacific; 500-1000 m (3) and possibly in British Columbia (4).

Figure. a. lateral view (2); b. dorsal view (2); c. dorsal view, anterior end (2); d. antenna (2); e. 1st thoracopod (1); f. endopod of 2nd thoracopod (2); g. 1st male pleopod (2); h. 2nd male pleopod (2); i. uropod (1); j. telson (1); k. telson (2).


a
b
c
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Teraterythrops robusta

Xenacanthomysis Holmquist, 1980

SYNONYMY AND REFERENCES

Xenacanthomysis Holmquist, 1980 (1)

Acanthomysis (in part)

CHARACTERIZATION (1)

Carapace. Anterolateral margins pointed; rostrum with convex sides to form smooth arc with no change in angle at midline.

Eyes. Normally developed with single approximately hemispherical cornea.

Antennules. In males, peduncle segments wide, width of 2nd equal to or longer than length; with a spiny knoblike process on each of the 2nd and 3rd segments in addition to the process masculinus; a row of striated semicircular structures along inner flagellum; in females these are all absent, peduncle is relatively thin, width of 2nd segment approximately ½ length.

Antennal scale. Setose all around; apex rounded; distal suture present.

Labrum. Pointed anterior process.

Thoracopods. Carpo-propodus 7-9 segmented; dactyl very small.

Oostegites. 2 ordinary pairs and 1 anterior rudimentary pair.

Abdomen. Smooth, no projections or folds.

Pleopods. All rudimentary in females, and all but 4th rudimentary in males, only unjointed plates; 4th with endopod less than ¼ length of exopod, which is stout; exopod with only one segment; 2 terminal barbed setae.

Uropods. No or one spine on lower inner margin of endopod adjacent to statocyst.

Telson. Narrow triangle with rounded, narrowly truncate apex, large and small lateral spines full length of margins with tendency to size grouping distally; increase in size from base to apex; apex with many small spines continuous with those on margin.

TAXONOMIC NOTES Under above narrow definition of genus only 1 species is known; there are differing interpretations on presence or absence of 1, 2 or 3 sutures of the exopod of the 4th male pleopod, which in any event are obscure (1).

Xenacanthomysis pseudomacropsis (W. Tattersall, 1933)

SYNONYMY AND REFERENCES

Neomysis pseudomacropsis W. Tattersall, 1933 (1)

Acanthomysis pseudomacropsis of Ii, 1936
Banner, 1948b (2)
Banner, 1954b
Banner, 1954c
Ii, 1964 (3)
Kozloff, 1974
W. Tattersall, 1951 (4)

Xenacanthomysis pseudomacropsis by Holmquist, 1980 (5)
Holmquist, 1981b (6)

CHARACTERIZATION (1, 2, 3, 4, 6)

Eyes. Length of eye including cornea 2-2.5X width of stalk; up to 3 times in juveniles.

Antennal scale. Length 5 times width.

Telson. Length approximately 3X width; small spines around apex of equal size and spacing.

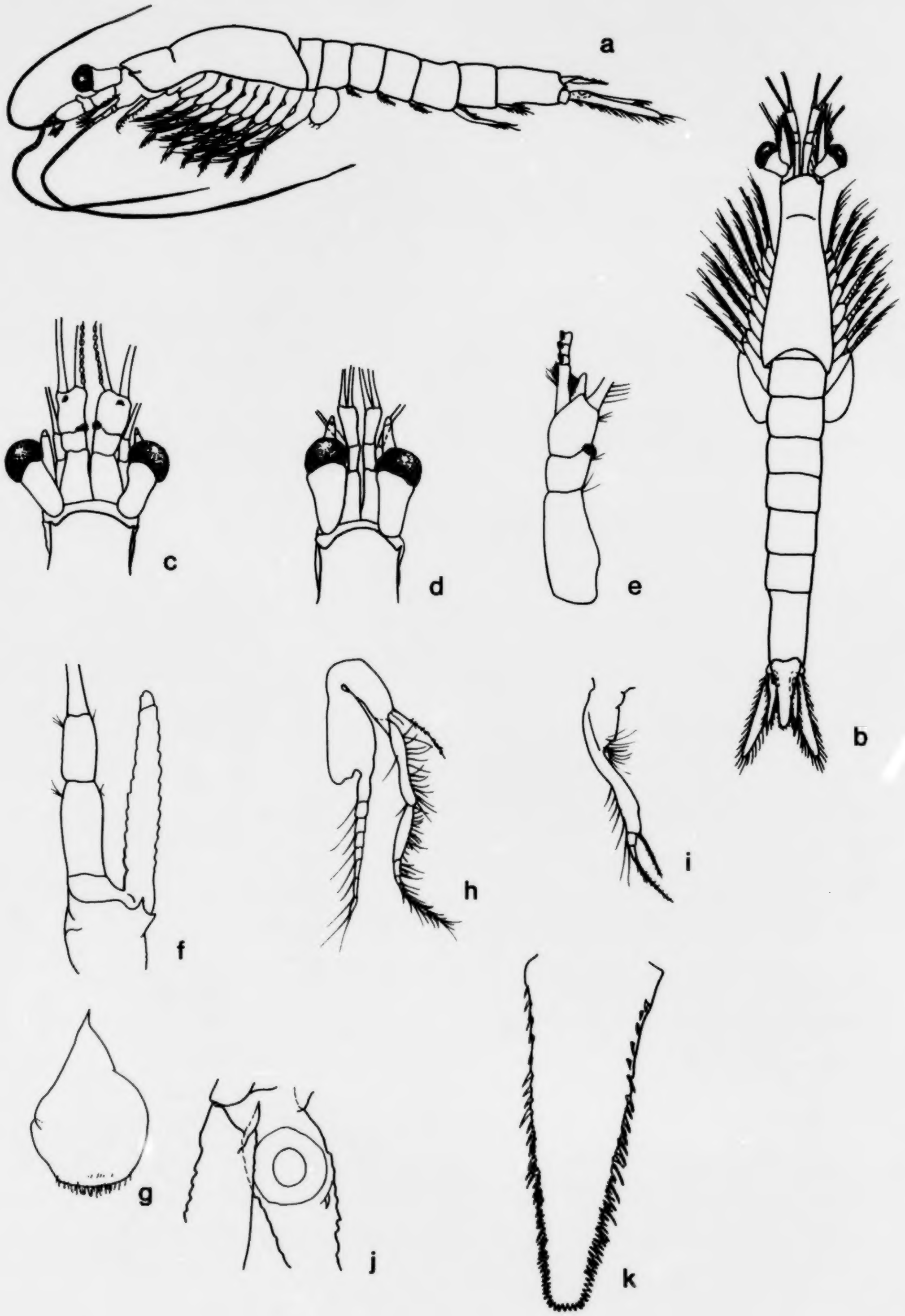
Size. 14-17 mm.

TAXONOMIC NOTES Females of this species may be difficult to distinguish from females of *Alienacanthomysis macropsis*, but the shape of the rostrum, telson and particularly labrum should facilitate identification. Banner (2) notes that eyes of juveniles may be slimmer, approaching the condition in *A. macropsis*. Both may occur in the same sample where their known ranges overlap--from Washington to southern Alaska (6). Tattersall (1) and (3) noted that jointing of the exopod of the 4th male pleopod is obscure but suggest the presence of three segments. Banner (2) stated that only a single segment is present and (5) concurred while noting what she considered to be incipient sutures.

DISTRIBUTION NE Pacific, Bering Sea, Beaufort Sea and south to Washington; neritic and ?littoral; 3-45+ m.

ECOLOGICAL NOTES Observed schooling in crevices and in the lee of boulders in shallow water of the Strait of Georgia, British Columbia (J. Marliave, pers. comm.).

Figure. a. lateral view, male (3); b. dorsal view, female (3); c. dorsal view, anterior end, male (3); d. dorsal view, anterior end, female (3); e. antennular peduncle, male (4); f. antenna (4); g. labrum (3); h. 3rd thoracopod (4); i. 4th male pleopod (4); j. uropod (part) (6); k. telson (6).


a
b
c
d
e
f
h
i
g
j
k

Xenacanthomysis pseudomacropsis

Index to Scientific Names (Mysidacea)

abbreviata
  Amblyops 55, 96
  Pseudomma; see Amblyops abbreviata
abbreviatum, Amblyops; see Amblyops abbreviata
"Acanthomysis" 63, 81, 85
  borealis 71, 86
  columbiae 63, 82
  stelleri 71, 88
Acanthomysis 63, 81, 85, 91, 127, 149, 209, 235
  alaskensis; see Exacanthomysis alaskensis
  borealis; see "Acanthomysis" borealis
  columbiae; see "Acanthomysis" columbiae
  costata; see Holmesimysis costata
  costata of W. Tattersall; see Exacanthomysis davisi
  davisi; see Exacanthomysis davisi
  dybowskii; see Disacanthomysis dybowskii
  macropsis; see Alienacanthomysis macropsis
  nephrophthalma; see Pacifacanthomysis nephrophthalma
  pseudomacropsis; see Xenacanthomysis pseudomacropsis
  sculpta; see Holmesimysis sculpta and H. sculptoides
  sculpta var. nuda; see Holmesimysis nuda
  species of Banner, 1948a; see Acanthomysis borealis
  stelleri: see "Acanthomysis" stelleri
  var. nuda; see Holmesimysis nuda
alaskensis
  Acanthomysis; see Exacanthomysis alaskensis
  Exacanthomysis 65, 150
Alienacanthomysis 63, 91
  macropsis 63, 92
Amblyops 55, 95
  abbreviata 55, 96
  abbreviatum; see Amblyops abbreviata
Amblyopsis; see Amblyops
  abbreviata; see Amblyops abbreviata
americana, Mysidella 36, 41, 192
anomala, Holmesiella 55, 168
Archaeomysis 36, 41, 99
  grebnitzkii 35, 41, 100
  maculata; see Archaeomysis grebnitzkii
  maculata of Tattersall; see Bowmaniella banneri
arctica
  Arctomysis; see Boreomysis arctica
  Boreomysis 51, 106
  Mysis; see Boreomysis arctica
Arctomysis arctica; see Boreomysis arctica
arctopacifica, Exacanthomysis 65, 152
armiger
  Petalophthalmus 41, 214
  Petalophthalmus (part); see Boreomysis inermis
australis, Eucopia 47, 140, 142, 144, 145
awatschensis, Neomysis of NE Pacific authors; see Neomysis mercedis

banneri, Bowmaniella; see Archaeomysis grebnitzkii
bengalensis, Gnathophausia; see Gnathophausia ingens
berkeleyi, Pseudomma 57, 222
biunguiculata, Eucopia; see Eucopia unguiculata
borealis, Acanthomysis 71, 86
Boreomysis 41, 103
  arctica 51, 104
  californica 51, 106
  distinguenda; see Boreomysis inermis
  inermis 51, 108
  inermis of Hansen, 1910; see Boreomysis rostrata
  jacobi; see Boreomysis sp. (rostrata complex)
  kincaidi; see Boreomysis californica
  media; see Boreomysis californica
  microps 51, 110
  rostrata; see Boreomysis sp. (rostrata complex)
  scyphops; see Boreomysis inermis
  sp. (rostrata complex) 51, 112
  subpellucida; see Boreomysis microps
  suhmi; see Boreomysis inermis
  tregouhoffi; see Boreomysis arctica
Bowmaniella banneri; see Archaeomysis grebnitzkii

Caesaromysides; see Caesaromysis
  liguriae; see Caesaromysis hispida
Caesaromysis 55, 115
  hispida 55, 116
  vanclevei; see Caesaromysis hispida
californica
  Boreomysis 51, 106
  Inusitatomysis; see Inusitatomysis insolita
calcarata, Gnathophausia; see Gnathophausia ingens
Callomysis; see Archaeomysis
  maculata; see Archaeomysis grebnitzkii
Ceratomysis 41, 119
  spinosa 41, 120
Chalaraspis 139
  unguiculata; see Eucopia unguiculata
  unguifer; see Eucopia unguiculata
columbiae, "Acanthomysis" 63, 82
Columbiaemysis 63, 123
  ignota 63, 124
costata
  Acanthomysis; see Holmesimysis costata
  Holmesimysis, 69, 172
  Mysis; see Holmesimysis costata
  Neomysis; see Holmesimysis costata

davisi, Exacanthomysis 65, 154
Disacanthomysis 63, 127
  dybowskii 63, 128
distinguenda, Boreomysis; see Boreomysis inermis
doryphora, Gnathophausia, see Gnathophausia ingens
drepanophora, Gnathophausia, see Gnathophausia gigas

dybowskii
  Acanthomysis; see Disacanthomysis dybowskii
  Disacanthomysis 63, 128
  Neomysis; see Disacanthomysis dybowskii
  Orientomysis; see Disacanthomysis dybowskii

Euchaetomera 55, 131
  fowleri; see Euchaetomera tenuis
  tenuis 55, 132
Euchaetomeropsis 55, 135
  pacifica 55, 136
Eucopia 36, 41, 139
  australis 47, 140
  biunguiculata; see Eucopia unguiculata
  grimaldii 47, 144, 145
  hanseni; see Eucopia unguiculata
  intermedia; see Eucopia sculpticauda
  major; see Eucopia australis
  sculpticauda 47, 142
  unguiculata 47, 144, 145
  species of Shih et al., 1971; see Eucopia unguiculata
Exacanthomysis 63, 149
  alaskensis 65, 150
  arctopacifica 65, 152
  davisi 65, 154

fowleri, Euchaetomera; see Euchaetomera tenuis
franciscana, Neomysis; see Neomysis rayi
franciscorum, Neomysis, see Neomysis rayi

gigas, Gnathophausia 43, 158
Gnathophausia 36, 41, 157
  bengalensis; see Gnathophausia ingens
  calcarata; see Gnathophausia ingens
  doryphora; see Gnathophausia ingens
  drepanophora; see Gnathophausia gigas
  gigas 43, 158
  inflata; see Gnathophausia ingens
  ingens 43, 160
grandis
  Mysideis; see Stilomysis grandis
  Mysis; see Stilomysis grandis
  Stilomysis 63, 228
grebnitzkii, Archaeomysis 36, 41, 100
grimaldii 47, 144, 145

hanseni, Eucopia; see Eucopia unguiculata
Heteromysis 36, 41, 164
  intermedia; see Neomysis intermedia
  odontops 36, 41, 164
  spinosus; see Heteromysis odontops
hispida, Caesaromysis 55, 116

Holmesiella 55, 167
  anomala 55, 168
Holmesimysis 69, 171
  costata 69, 172
  nuda 69, 174
  nudensis 69, 176
  sculpta 69, 178
  sculptoides 69, 180

ignota, Columbiaemysis 63, 124
inflata; see Gnathophausia ingens
ingens
  Gnathophausia 43, 160
  Lophaster; see Gnathophausia ingens
inermis
  Boreomysis 51, 108
  Boreomysis of Hansen, 1910; see Boreomysis rostrata
  Petalophthalmus; see Boreomysis inermis
insolita, Inusitatomysis 63, 184
intermedia
  Eucopia; see Eucopia sculpticauda
  Neomysis; see Neomysis mercedis
  Neomysis of N.E. Pacific authors; see Neomysis mercedis
Inusitatomysis 63, 183
  californica; see Inusitatomysis insolita
  insolita 63, 184
  serrata; see Inusitatomysis insolita
  species of Banner, 1948; see Inusitatomysis insolita
jacobi, Boreomysis; see Boreomysis sp. (rostrata complex)

kadiakensis, Neomysis 77, 202
Katherythrops; see Teraterythrops robusta
kincaidi, Boreomysis; see Boreomysis californica

liguriae, Caesaromysides; see Caesaromysis hispida
litoralis
  Mysis 75, 196
  Pugetomysis; see Mysis litoralis
Lophaster ingens; see Gnathophausia ingens

macropsis
  Acanthomysis; see Alienacanthomysis macropsis
  Alienacanthomysis 63, 92
  Neomysis; see Alienacanthomysis macropsis
maculata
  Archaeomysis; see Archaeomysis grebnetzkii
  Archaeomysis of Tattersall; see Bowmaniella banneri
  Callomysis; see Archaeomysis grebnitzkii
major, Eucopia; see Eucopia australis
media, Boreomysis; see Boreomysis californica
mercedis, Neomysis 77, 204

Meterythrops 55, 187
  microphthalma; see Meterythrops robusta
  robusta 55, 188
Michtheimysis; see Mysis
microphthalma, Meterythrops; see Meterythrops robusta
microps, Boreomysis 55, 110
Mysideis grandis; see Stilomysis grandis
Mysidella 36, 41, 191
  americana 36, 41, 192
Mysis 63, 195
  arctica; see Boreomysis arctica
  costata; see Holmesimysis costata
  grandis; see Stilomysis grandis
  litoralis 75, 196
  oculata of N.E. Pacific authors; see Mysis litoralis
  oculata relicta; see Mysis relicta
  rayii; see Neomysis rayi
  relicta 75, 198

Neomysis 63, 81, 91, 149, 201
  awatschensis of N.E. Pacific authors; see Neomysis litoralis
  columbiae; see "Acanthomysis" columbiae
  costata; see Holmesimysis costata
  costata of W. Tattersall; see Exacanthomysis davisi
  dybowskii; see Disacanthomysis dybowskii
  franciscana; see Neomysis rayi
  franciscorum; see Neomysis rayi
  intermedia; see Neomysis mercedis
  kadiakensis 77, 202
  macropsis; see Alienacanthomysis macropsis
  mercedis 77, 204
  pseudomacropsis; see Xenacanthomysis pseudomacropsis
  rayi 77, 206
  rayii; see Neomysis rayi
  sculpta; see Holmesimysis sculpta and H. sculptoides
  stelleri; see Acanthomysis stelleri
  toion; see Neomysis rayi
nephrophthalma
  Acanthomysis; see Pacifacanthomysis nephrophthalma
  Pacifacanthomysis 63, 210
nuda, Holmesimysis 69, 174
nudensis, Holmesimysis 69, 176

oculata, Mysis of N.E. Pacific authors; see Mysis litoralis
oculata relicta, Mysis; see Mysis relicta
odontops, Heteromysis 36, 41, 164
Orientomysis
  dybowskii; see Disacanthomysis dybowskii
  stelleri; see "Acanthomysis" stelleri

Pacifacanthomysis 63, 209
  nephropthalma 63, 210
pacifica, Euchaetomeropsis 55, 136

pacificus, Petalophthalmus; see Petalophthalmus armiger
Parerythrops robusta; see Meterythrops robusta
Petalophthalmus 41, 213
  armiger 41, 214
  armiger, in part; see Boreomysis inermis
  inermis; see Boreomysis inermis
  pacificus; see Petalophthalmus armiger
Praunus integer; see Neomysis integer
Proneomysis 63, 217
  wailesi 63, 218
pseudomacropsis
  Acanthomysis; see Xenacanthomysis pseudomacropsis
  Neomysis; see Xenacanthomysis pseudomacropsis
  Xenacanthomysis 63, 236
Pseudomma 55, 221
  abbreviata; see Amblyops abbreviata
  berkeleyi 57, 222
  species of Holmquist, 1982; see Pseudomma truncatum
  species of Esterley, 1914; see Pseudomma berkeleyi
  truncatum 57, 224
Pugetomysis; see Mysis
  litoralis; see Mysis litoralis

rayi, Neomysis 77, 206
rayii, Neomysis; see Neomysis rayi
relicta, Mysis 75, 198
robusta
  Meterythrops 55, 188
  Parerythrops; see Meterythrops robusta
  Synerthrops; see Teraterythrops robusta
  Teraterythrops 55, 232
rostrata complex, Boreomysis 51, 112

sculpta
  Acanthomysis; see Holmesimysis sculpta
  Holmesimysis 69, 178
  Neomysis; see Holmesimysis sculpta
sculpta var. nuda
  Acanthomysis; see Holmesimysis nuda
  Holmesimysis; see Holmesimysis nuda
sculpticauda, Eucopia 47, 142
sculptoides, Holmesimysis 180
scyphops, Boreomysis; see Boreomysis inermis
serrata, Inusitatomysis; see Inusitatomysis insolita
spinosa, Ceratomysis 41, 120
spinosus, Heteromysis; see Heteromysis odontops
stelleri
  "Acanthomysis" 71, 88
  Acanthomysis; see "Acanthomysis" stelleri
  Neomysis; see "Acanthomysis" stelleri
  Orientomysis; see "Acanthomysis" stelleri

Stilomysis 63, 227
  grandis 63, 228
subpellucida, Boreomysis; see Boreomysis microps
suhmi, Boreomysis; see Boreomysis inermis

tenuis, Euchaetomera 55, 132
Teraterythrops 55, 231
  robusta 55, 232
  tanakai; see Teraterythrops robusta
toion, Neomysis; see Neomysis rayi
tregouhoffi, Boreomysis; see Boreomysis arctica
truncatum, Pseudomma 57, 224
unguiculata
  Chalaraspis; see Eucopia unguiculata
  Eucopia 47, 140, 144, 145
unguifer, Chalaraspis; see Eucopia unguiculata

vanclevei, Caesaromysis; see Caesaromysis hispida

wailesi, Proneomysis 63, 218

Xenacanthomysis 63, 235
  pseudomacropsis 63, 236

PART 2

EUPHAUSIACEA

EUPHAUSIACEA

Introduction

The euphausiids, or krill (from the Norwegian word 'kril', meaning young fry) were once part of the Schizopoda, but now belong to the crustacean Order Euphausiacea and Superorder Eucarida. They superficially resemble shrimp within the Decapoda, another Order of Eucarida. The cephalothorax (combined head and thorax) and abdomen are the two main body divisions. Head and mouth appendages include stalked eyes, one pair each of antennules and antennae, for sensory, olfactory, feeding and balancing functions; and the labrum, mandibles, labia, maxillulae and maxillae for feeding purposes. The thoracic region contains six to eight pairs of biramous appendages (thoracopods); often the 1st, 2nd and/or 3rd are modified for feeding, and the 7th and/or 8th are reduced or vestigial. Compound sensory organs located in front of the cervical groove on the carapace have been found to be a diagnostic characteristic (Mauchline and Nemoto, 1977) and are shown in Figure 1 for some Northeast Pacific species. Each of the first five abdominal segments bears a pair of biramous pleopods for swimming, while the 6th segment bears the uropods and telson and may carry a preanal spine. The endopod of the first pair of abdominal appendages in the male is modified to form the petasma, which is diagnostic for the species. The female copulatory organ, or thelycum, is located on the sixth abdominal segment and is also diagnostic. The patterns of integumental sensilla found dorsally on the abdominal segments (especially the 4th and 5th) can be specific and may be used for identification (Mauchline and Nemoto, 1977). The uropods are biramous, consisting of an endopod and exopod, and together with the telson form the tail fan.

Approximately 85 species of euphausiids are found worldwide in the marine environment. One of the two families, Bentheuphausiidae, is represented by a single genus and species, Bentheuphausia amblyops, while the other family, Euphausiidae, contains 10 genera, seven of which are found in the Northeast Pacific. Twenty-three species of euphausiids have been identified from our study region. An incidental species, Nyctiphanes simplex, was collected by R. Brodeur (Oregon State University) in the Strait of Juan de Fuca during the 1983-84 El Niño event. Although there were gravid females in the catch, none

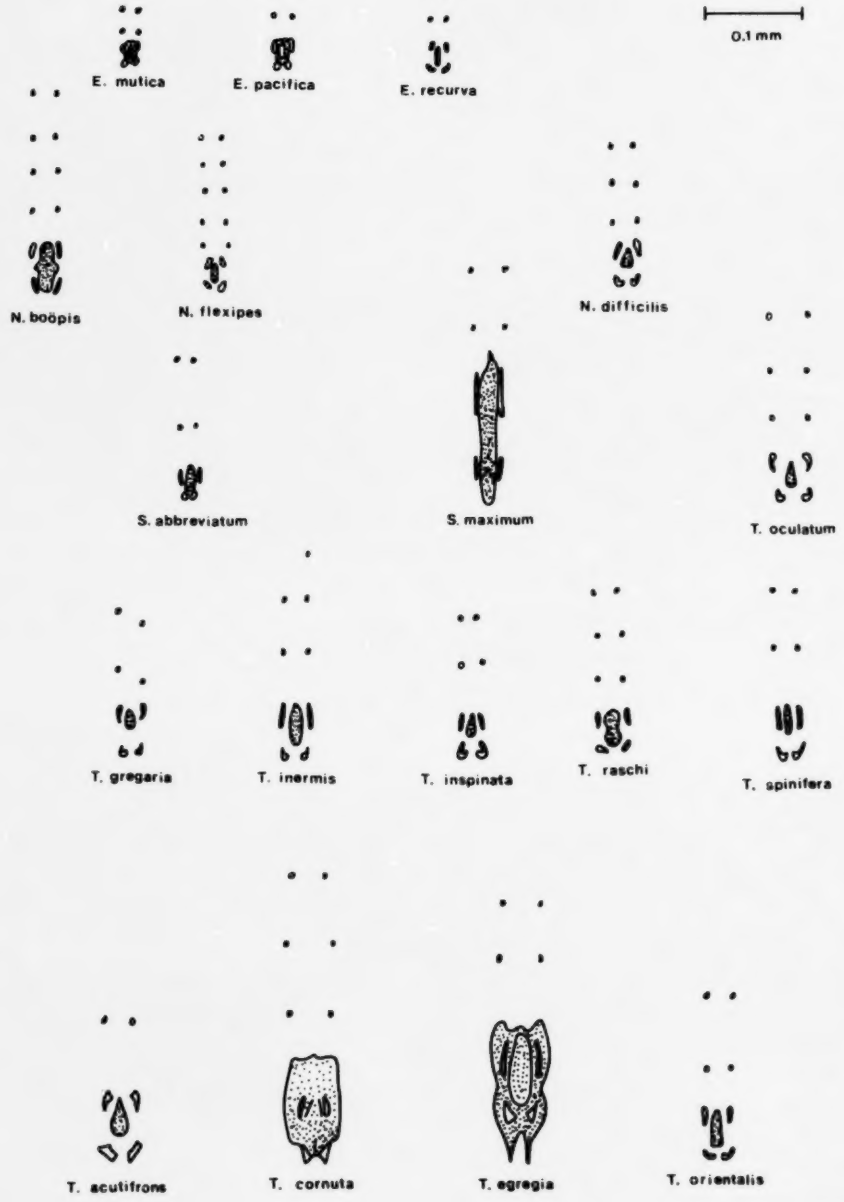

0.1 mm
E. mutica
E. pacifica
E. recurva
N. boöpis
N. flexipes
N. difficilis
S. abbreviatum
S. maximum
T. oculatum
T. gregaria
T. inermis
T. inspinata
T. raschi
T. spinifera
T. acutifrons
T. cornuta
T. egregia
T. orientalis

Figure 1. Compound organs of some euphausiids from the Pacific Northeast (from Mauchline and Nemoto, 1977). (Note: Preparation for observation of these organs is complicated, see reference.)

were found subsequent to this, and are generally found from Cape Mendocino south in warmer temperatures (R. Brodeur, personal communication). We have included N. simplex in the Diagnoses section but not in the keys.

First reports of euphausiids were made in 1820 by William Scoresby, Jr., who observed the common right whale feeding on what he called squillae, shrimps or insects. Since then numerous studies have focused on the ecology, distribution, development and economics of euphausiids. Readers should refer to the thorough account of euphausiid biology given by Mauchline and Fisher (1969) and Mauchline (1980), on which most of the following discussion is based. In-depth studies by Boden et al. (1955), Brinton (1962, 1975), Einarsson (1945), McWhinnie et al. (1981), Nemoto (1966) and Sars (1885) should also be consulted. Other major contributors whose literature is referenced throughout this manuscript are Banner, Gopalakrishnan, Hansen, Ponomareva and Zimmer.

Distribution and Ecology

In B.C. coastal waters euphausiid distribution is not generally limited by either temperature or salinity except in the very shallow surface layer at the heads of some inlets. Regan (1968) and Gilfillan (1970) determined that the lower critical salinity for migration and survival lies between 15 and 20 o/oo. Thirteen of the 22 local species inhabit the epipelagic marine environments, while six species are mesopelagic and three species are bathypelagic (Table 1). Species are usually found within specific latitudinal zones (e.g., Euphausia mutica: 40°N-40°S; Tessarabrachion oculatum: 35°N-53°N; Thysanoessa inermis: 43°N-63°N in the Pacific), or are associated with certain ranges of temperature (e.g., Thysanopoda orientalis: 9-10°C; T. acutifrons: 4-10°C; Euphausia pacifica: >9.5°C) or depth (e.g., Thysanopoda egregia: >2000 m; Euphausia mutica: <400 m). Distribution patterns for many species are probably incomplete due to limited sampling efforts, especially in the open ocean. Mauchline and Fisher (1969) present an extensive overview of worldwide euphausiid distributions, and Brinton (1962) reviews the distribution of 59 species in the Pacific.

All epipelagic species, possibly excepting certain Thysanoessa species and a few mesopelagic euphausiids, perform diurnal vertical migrations, often travelling more than 500 meters daily. Adults migrate farther than immatures, often occurring at much deeper depths during daylight, and Roger (1971) has found correlations of increasing body size with increasing depth. Generally, the larger individuals of a species occur at greater depths than the smaller individuals and this size gradient is maintained throughout migrations (Mauchline, 1980). Numerous other factors affecting vertical migration include salinity, oxygen, temperature, density, viscosity, pressure, light and availability and abundance of food items.

Most euphausiids are probably opportunistic feeders, feeding on the most available and abundant items. They are generally filter feeders of algae, plankton and detritus, although some (e.g., Euphausia pacifica, Thysanoessa inermis) can be actively predaceous. Roger (1975) found that, in general, most feeding rhythms are unique within genera. Euphausia generally feed at night, Nematobrachion and Nematoscelis between noon and midnight, Stylocheiron during the day, and Thysanopoda continuously.

All euphausiids except Bentheuphausia amblyops have large compound eyes with well developed ommatidia and photophores on the eyestalks. Shape and size of the eyes are diagnostic characteristics. There is a substantial amount of brown to black pigment in each eye, which leads to another common name, 'suil dhu', for euphausiids (from Gaelic, meaning black eyes). Ten photophores are present, one pair located on the eyestalks, one pair at the bases of the second and seventh thoracopods and a single photophore between each of the first four pairs of pleopods in all euphausiids except Bentheuphausia amblyops, which has none, and the species of Stylocheiron, which have five. Those of Stylocheiron are located on the eyestalks, paired on the bases of the seventh thoracopods and a single one is found between the first pleopods.

Euphausiids have long been recognized as an important food item for whales, fishes and birds, where they represent a major portion of the plankton biomass, especially well documented in the North Atlantic and Antarctic. The role of euphausiids in the feeding ecology of birds in the Queen Charlotte Islands area of B.C. has been studied by Sealy, 1975; Vermeer, 1985; Vermeer and Cullen, 1982; and Vermeer et al., 1985. Euphausiids have now become economically important as a protein supplement for both human and animal consumption, and are sold fresh, freeze-dried, pickled and frozen throughout the world. In B.C., euphausiids have been harvested in the Strait of Georgia and adjacent inlets since 1970. Heath (1977) studied life history, growth, mortality, population structure and production of E. pacifica in the Strait of Georgia in relation to commercial harvesting. The commercial fishing potential for euphausiids on the shelf and slope of B.C. has also been investigated (Fulton and LeBrasseur, 1984). Every euphausiid, unlike only some species in other invertebrate groups, synthesizes and stores vitamin A in fairly high concentrations, thus making significant contributions to the vitamin A cycle in the sea. The detritivorous species (e.g., *Thysanoessa raschi*) are important nutrient recyclers, mixing and ingesting the sediments and releasing fecal pellets during vertical migrations. Euphausiids may also serve as vertical and horizontal transporters and distributors of radioisotopes and heavy metals, which can be absorbed through ingestion and released during egestion and molting (Beasley et al., 1978; Cherry et al., 1978; Elder and Fowler, 1977; Higgo et al., 1977; *cited in* Mauchline, 1980).

Table 1. General distributional zones for euphausiids in the Pacific Northeast (after Brinton, 1962).

Epipelagic:	*Euphausia gibboides*
	E. mutica
	E. pacifica
	E. recurva
	Nematoscelis difficilis
	Thysanoessa gregaria
	T. inermis
	T. inspinata
	T. longipes
	T. raschi
	T. spinifera
	*Thysanopoda acutifrons**
Mesopelagic:	*Nematobrachion boopis*
	N. flexipes
	Nematoscelis tenella
	Stylocheiron longicorne
	S. maximum
	Tessarabrachion oculatum
	Thysanopoda orientalis
Bathypelagic:	*Bentheuphausia amblyops*
	Thysanopoda cornuta
	T. egregia

*Occurs in all zones, to 4000 meters.

Reproduction and Growth Stages

The ovary of the female, containing a few thousand small eggs, begins increasing in size usually between November and December. Four phases of egg growth can be distinguished, from tiny (0.1 mm) eggs with a large nucleus and granular cytoplasm in the first phase, to large (0.4 mm) eggs in which the nucleus is barely visible in the yolk-filled cytoplasm during the fourth phase.

Development of the male genital system coincides with that of the female ovary. Vasa deferentia also develop in phases, and after several months spermatophores are present in the ejaculatory ducts. The modified first pleopods or petasmae, previously believed to aid in the mechanical transfer of the spermatophore and thus termed 'copulatory organs', are now believed to be sensory or secretory, stimulating the female to accept impregnation, resulting in ovulation (Brinton, 1975). Because they are a reliable diagnostic characteristic for specific identification, the petasmae of all species found locally are presented in Appendix C.

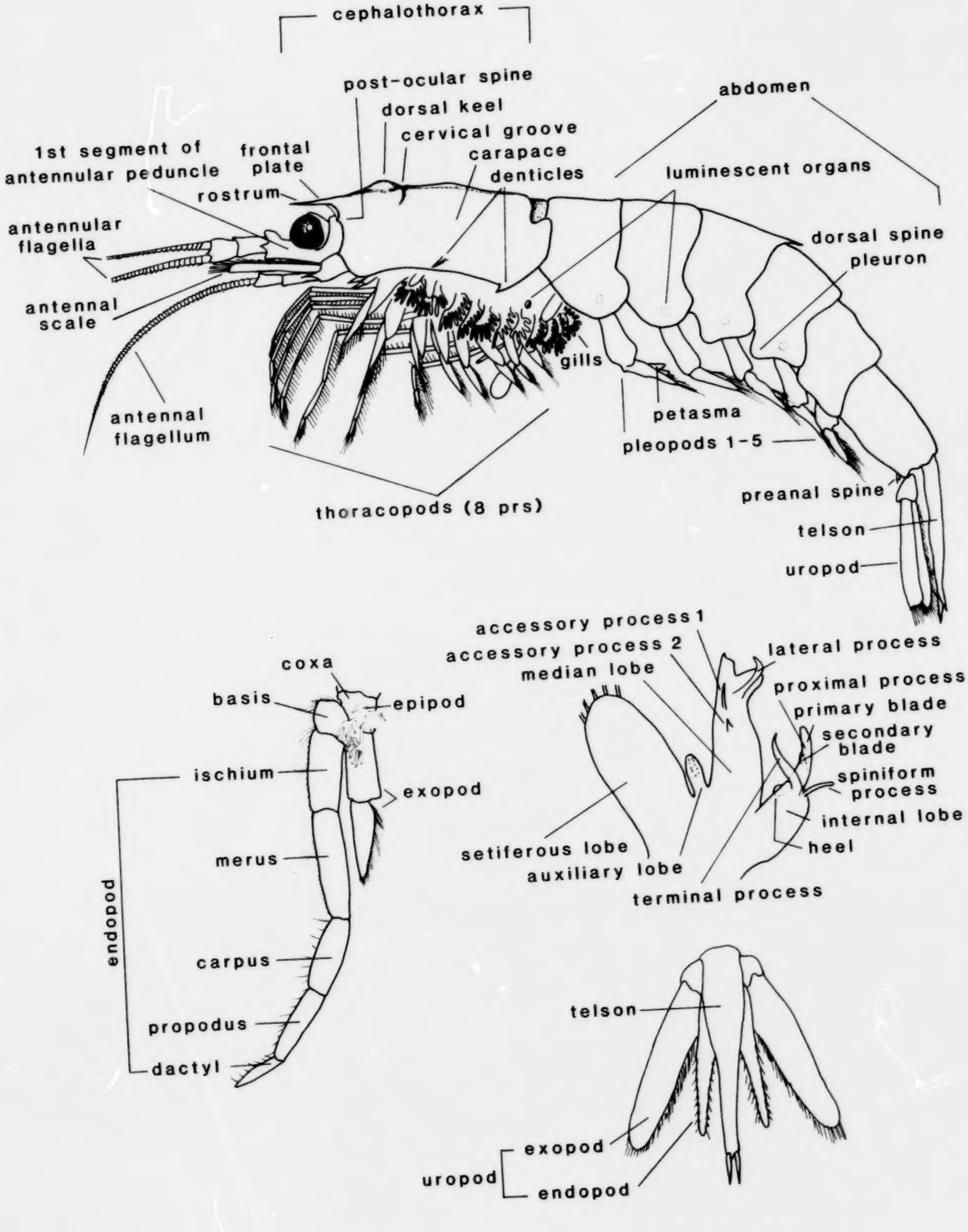
Following mating in the spring, eggs are either deposited directly into the sea for development or are retained until the naupliar or pseudometanaupliar larvae emerge. Sixty-one species deposit eggs directly into the sea, but the species of four genera (including Nematoscelis and Stylocheiron in the Northeast Pacific) retain their eggs (Mauchline, 1980 and Brinton, personal communication). Four principle phases of larval development are now recognized, although there is still disagreement about terminology and number of phases and substages. An example of the phases showing morphological changes during development is presented in Figures 2 and 3 for Thysanoessa inermis and should be consulted for the following discussion. The first phase, or nauplius, has an oval body which is still egglike. A median eye and three pairs of appendages, uniramous antennules, biramous antennae and biramous mandibles, are present. The pseudo-metanauplius, a second naupliar or pre-metanaupliar phase in some species, is a term used to describe the larvae during the short time span when they are released into the sea. In some genera the pseudo-metanauplius develops gradually into the metanauplius without molting (Komaki, 1967). Few morphological differences exist between this phase and the metanauplius.

The antennules and antennae are retained during the second phase, or metanauplius, but the mandibles are reduced and budlike. The median eye is still visible, but the compound eyes have appeared. The abdomen protrudes from the carapace and has several spines developing on the telson.

The calyptopis, or third phase, is characterized by the division of the organism into the cephalothorax and abdomen; a distinct carapace, mandibles, maxillae and first thoracopods; imperfectly developed compound eyes; segmentation in the abdomen; development of the telson; preliminary development of the uropods; and the beginning of active feeding. This stage itself is divided into three phases, and specific developmental changes for each phase were described by Brinton (1961) and Mauchline and Fisher (1969).

During the fourth phase, or furcilia, the antennules become articulated; the compound eyes become more fully developed and extend beyond the carapace; and the thoracic and abdominal appendages begin to develop. There are generally four stages of development during this phase, distinguished by the presence and types of abdominal photophores and telson spination, but these stages may vary with species and geographical distribution. Oceanic species generally exhibit more consistent growth patterns than those found in coastal or shallow waters. This phase previously included the cyrtopia stage, a term no longer used. It is followed by the post larval phase, in which all the appendages and telson have assumed their definite form and ornamentation.

Growth rates of each adult species varies in accordance with food and temperature, but generally body volume and weight are directly related to body length. Differences in weight and length often occur between males and females of a species, and have been correlated with different seasons (Ponomareva, 1963). At sexual maturity the gonads and carapace are enlarged, also changing the weight to length relationship.


cephalothorax
post-ocular spine
dorsal keel
cervical groove
carapace
denticles
abdomen
luminescent organs
1st segment of antennular peduncle
frontal plate
rostrum
antennular flagella
antennal scale
antennal flagellum
dorsal spine
pleuron
gills
petasma
pleopods 1-5
thoracopods (8 prs)
preanal spine
telson
uropod
accessory process 1
accessory process 2
median lobe
lateral process
proximal process
primary blade
secondary blade
spiniform process
internal lobe
heel
setiferous lobe
auxiliary lobe
terminal process
coxa
basis
epipod
ischium
exopod
merus
endopod
carpus
propodus
dactyl
telson
exopod
uropod
endopod

Morphology of a generalized euphausiid

From Comparative Morphology of Recent Crustacea by P.A. McLaughlin.
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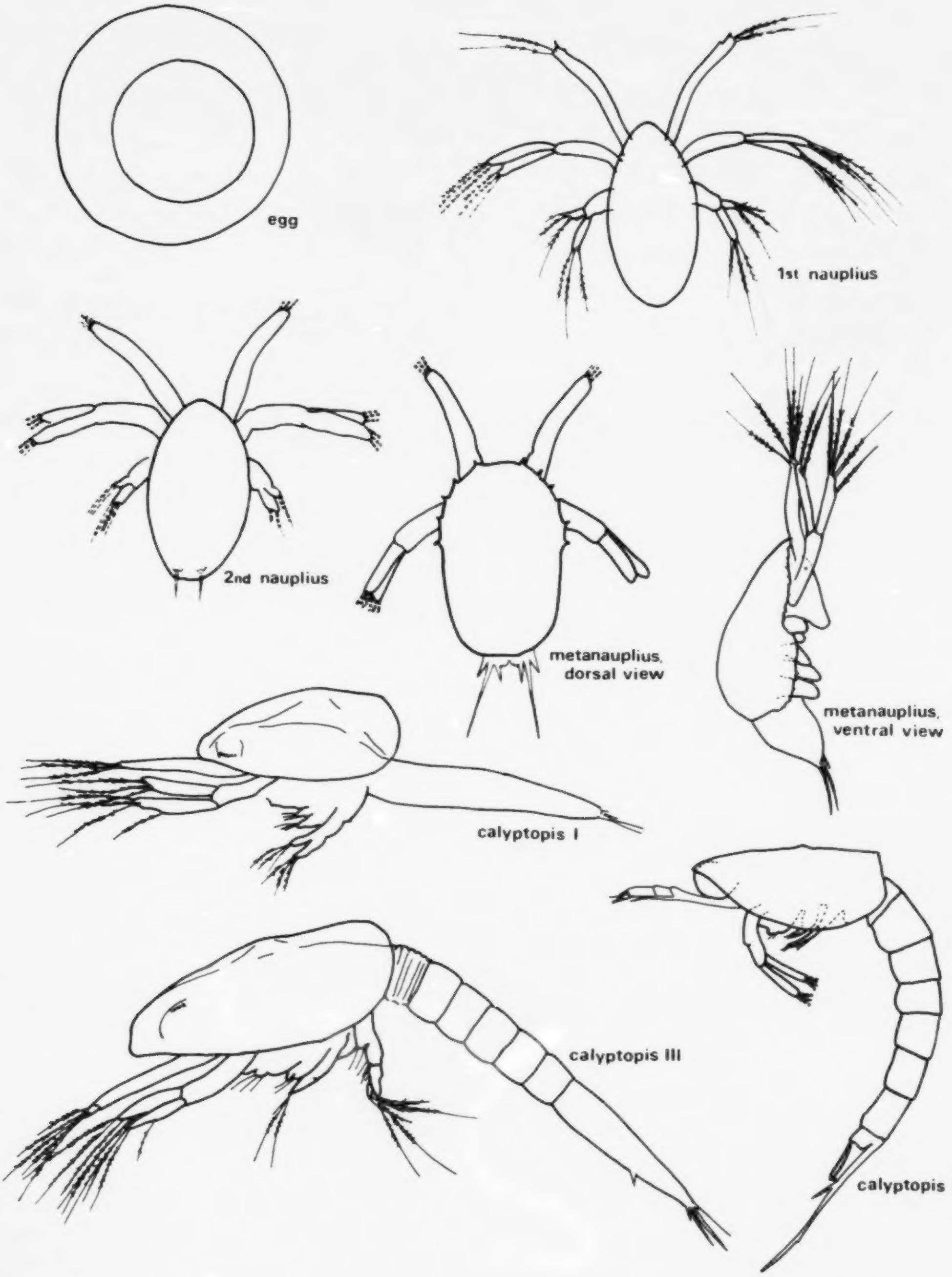

egg
1st nauplius
2nd nauplius
metanauplius, dorsal view
metanauplius, ventral view
calyptopis I
calyptopis III
calyptopis II

Figure 2. Stages of development for Thysanoessa inermis, egg through calyptopis III (after Einarsson, 1945 and Lebour, 1926).

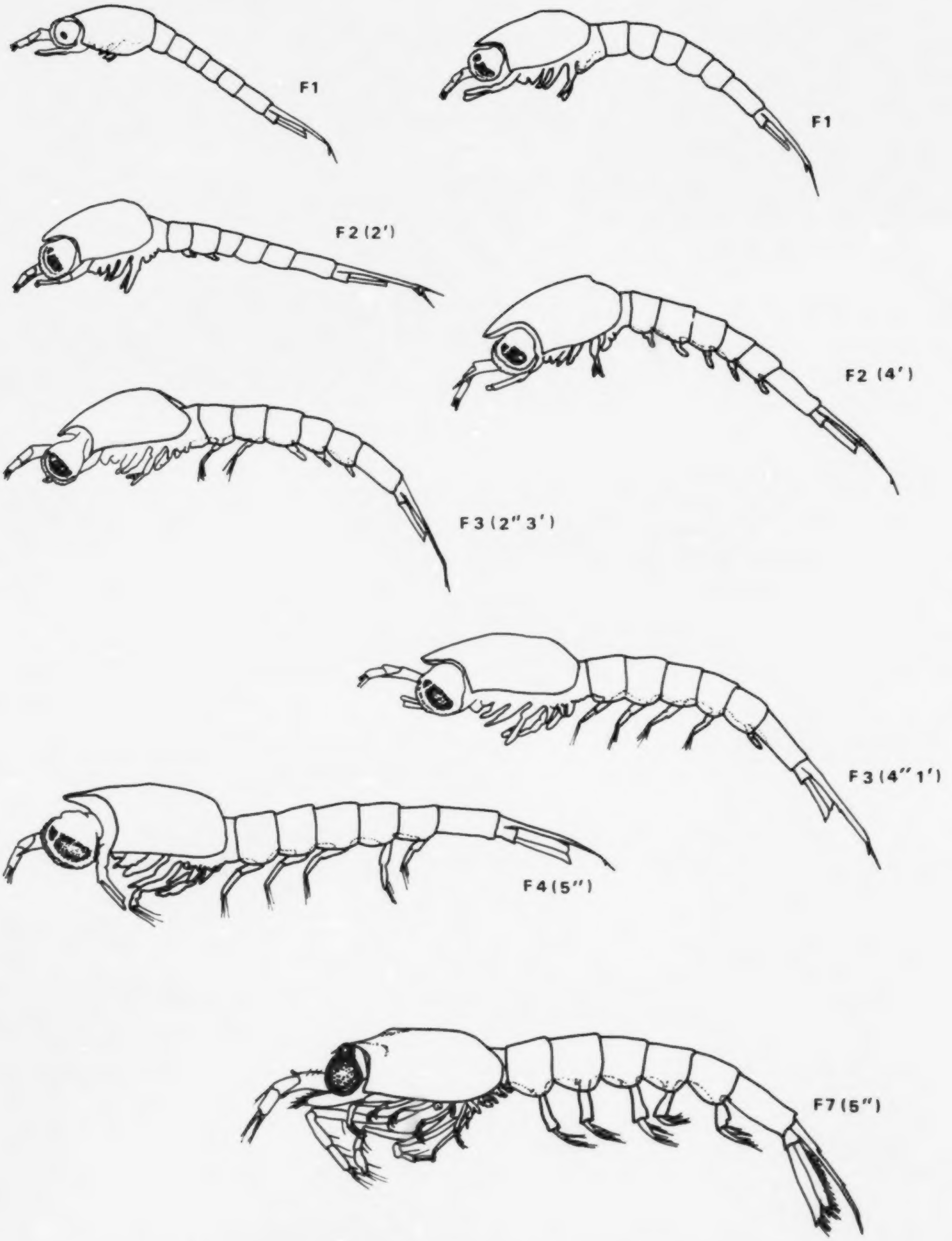

F1
F1
F2 (2')
F2 (4')
F3 (2" 3')
F3 (4" 1')
F4 (5")
F7 (5")

Figure 3. Various furcilia stages of development for Thysanoessa inermis (after Einarsson, 1945). (') = number of legs without setae, (") = number of legs with setae.

SPECIES LIST

Order Euphausiacea

Family Bentheuphausiidae

Bentheuphausia amblyops G.O. Sars, 1885

Family Euphausiidae

Euphausia gibboides Ortmann, 1893
Euphausia mutica Hansen, 1905
Euphausia pacifica Hansen, 1911
Euphausia recurva Hansen, 1905
Nematobrachion boopis (Calman, 1905)
Nematobrachion flexipes (Ortmann, 1893)
Nematoscelis difficilis Hansen, 1911
Nematoscelis tenella G.O. Sars, 1883
Nyctiphanes simplex Hansen, 1911 (Diagnosis only)
Stylocheiron longicorne G.O. Sars, 1883
Stylocheiron maximum Hansen, 1908
Tessarabrachion oculatum Hansen, 1911
Thysanoessa gregaria G.O. Sars, 1883
Thysanoessa inermis (Kröyer, 1846)
Thysanoessa inspinata Nemoto, 1963
Thysanoessa longipes Brandt, 1851
Thysanoessa raschi (M. Sars, 1864)
Thysanoessa spinifera Holmes, 1900
Thysanopoda acutifrons Holt and Tattersall, 1905
Thysanopoda cornuta Illig, 1905
Thysanopoda egregia Hansen, 1905
Thysanopoda orientalis Hansen, 1910

KEYS TO THE EUPHAUSIACEA

KEY GROUP I (KG I)

KEY TO THE GENERA OF EUPHAUSIIDS

EYES: shape, size (lateral view)

Sm : Small; largest diameter is less than width of 1st segment of antennular peduncle
Rd : Rounded
Cs : Constricted; with a distinct upper and lower part
Cc : Crystalline cones; cones directed upward in upper part of eye

THORACIC LEGS: length (legs often missing in preserved specimens)

Eq : Equal; all legs approximately the same size, although sometimes 2nd/3rd pairs are slightly longer than others
2L : 2nd pair of legs obviously longer than others
3L : 3rd pair of legs obviously longer than others
2L,3L : 2nd and 3rd pairs of legs obviously longer than others

ROSTRUM: length

S : Short; less than ½ length of 1st segment of antennular peduncle
M : Medium; approximately ½ length of 1st segment of antennular peduncle
L : Long; more than ½ length of 1st segment of antennular peduncle

ROSTRUM: shape (dorsal view)

Ns : Narrow straight; rostrum narrow and straight from frontal plate to apex
Nt : Narrow triangular; rostrum narrow but forming a triangle from frontal plate to apex
Bt : Broad triangle; rostrum and frontal plate wide, forming an angle of approximately 90° at the apex
Fl : Flat; frontal plate nearly straight across
Ot : Obtuse triangular; rostrum and frontal plate very wide, forming an angle of about 135° at the apex
Br : Broadly rounded; forming a rounded frontal plate and rostrum having convex sides
Var : Variable; rostrum varies in shape among species

ROSTRUM: width (dorsal view)

N : Narrow; frontal plate and/or rostrum slender, usually forming an acute angle

B : Broad; frontal plate and/or rostrum wide, usually forming an obtuse angle

CERVICAL GROOVE: present

Y : Yes; cervical groove on carapace present

N : No; no cervical groove on carapace

DENTICLES: present (staining may be necessary to see denticles)

Y : Yes; denticles on carapace present

N : No; denticles on carapace absent

ABDOMINAL KEEL: present

Y : Yes; one or more dorsal keels present on abdominal segments. A specific number indicates which segment

N : No; no dorsal keels present on any abdominal segments

1st SEGMENT ANTENNULAR PEDUNCLE: lateral spine

Y : Yes; spine present on outer distal margin

N : No; spine absent on outer distal margin

1st SEGMENT ANTENNULAR PEDUNCLE: barbed spine

Y : Yes; 1-3 long barbed spines present on the inner distal margin

N : No; no long barbed spines present on the inner distal margin

	EYES: Shape, size	THOR. LEGS: length	ROSTRUM: length	ROSTRUM: shape	ROSTRUM: width	CERV. GR.: present	DENTICLES: present	ABD. KEEL: present	SEG. 1, PED.: sp.	SEG. 1, PED.: barb.
Bentheuphausia (*amblyops*) 281	Sm	Eq	S	Br	B	Y	N	N	N	N
Thysanopoda egregia KG2 264	Sm	Eq	M	Fl	B	Y	N	4, 5	Y	N
Thysanopoda (*cornuta*) KG2 266	Rd	Eq	S	Br	B	Y	N	4, 5	Y	N
Thysanopoda orientalis KG2 264	Rd	Eq	M	Br	B	N	N	N	Y	N
Thysanopoda acutifrons KG2 264	Rd	Eq	M	Bt	B	N	N	N	Y	N
Euphausia KG3 266	Rd	Eq	M	Ns/Nt	N	N	I/2	N	N	N
Euphausia (*pacifica*) KG3 266	Rd	Eq	S	Ot	B	N	I	N	N	N
Thysanoessa (in part) KG4 270	Rd	Eq	L	Var	N/B	N	N/I	N/Y	Y	N
Nematoscelis KG5 274	Cs	2L	S/L	Ns/Nt	N	N	N/Y	N	Y	Y
Thysanoessa (in part) KG4 270	Cs	2L	L	Var	N/B	N	Y	N/Y	Y	Y
Tessarabrachion (*oculatum*) 323	Cs	2L,3L	S	Br	B	Y	N	N	Y	Y
Nematobrachion (*flexipes*) 297	Cs	3L	L	Ns	N	N	N	N	Y	N
Nematobrachion (*boopis*) 297	Cs	3L	S	Br	B	Y	N	N	N	N
Stylocheiron maximum KG6 264	Cs	3L	L	Bt	B	Y	N	N/Y	Y	Y
Stylocheiron longicorne KG6 276	Cc	3L	M	Ns/Nt	N/B	N	N	N	Y	Y

KEY GROUP 2 (KG 2)

KEY TO SPECIES OF *Thysanopoda*

ROSTRUM: length

S : Short; less than ½ length of 1st segment of antennular peduncle

M : Medium; approximately ½ length of 1st segment of antennular peduncle

ROSTRUM: shape

Bt : Broadly triangular; forming a broad triangle shaped frontal plate and rostrum

Br : Broadly rounded; forming a rounded frontal plate and rostrum having convex sides

Fl : Flat; frontal plate nearly straight across

ROSTRUM: apex

R : Rounded; tip of apex rounded

P : Pointed; tip of apex pointed

CERVICAL GROOVE: present

Y : Yes; cervical groove in anterior 1/3 of carapace

Y : No; no cervical groove

KEEL: present

Y : Yes; dorsal keel on carapace present; number indicates segments

N : No; no dorsal keel on carapace

SPINES: present

Y	:	Yes; spines present on one or more abdominal segments
N	:	No; no spines on any abdominal segments

KEEL: abdominal segment

N	:	No keel on any abdominal segment

Number listed represents number of abdominal segment on which keel occurs

6th SEGMENT: 5th segment

Eq	:	Equal; the 6th abdominal segment is approximately the same length as the 5th abdominal segment
1.5-2.0x	:	Longer; the 6th abdominal segments is approximately 1½-2 times as long as the 5th abdominal segment

ROSTRUM: length	ROSTRUM: shape	ROSTRUM: apex	CERV. GROOVE: present	KEEL: present	SPINES: present	KEEL: abd. segment	6th SEG.: 5th seg.	SIZE: mm	
M	Bt	P	N	Y	N	N	1.5-2.0x	35-50	*T. acutifrons* 352
S	Br	R	Y	Y	N	4, 5	Eq	<95	*T. cornuta* 356
M	Fl	R	Y	Y	N	4, 5	Eq	40-62	*T. egregia* 360
M	Br	P	N	Y	N	N	1.5-2.0x	23-38	*T. orientalis* 364

KEY GROUP 3 (KG 3)

KEY TO SPECIES OF *Euphausia*

ROSTRUM: length

S : Short; less than ½ length of 1st segment of antennular peduncle

M : Medium; less than ½ length of 1st segment of antennular peduncle

ROSTRUM: shape

Ns : Narrow straight; rostrum narrow and straight from frontal plate to apex

Nt : Narrow triangular; rostrum narrow but forming a triangle from frontal plate to apex

Ot : Obtuse triangular; rostrum and frontal plate very wide, forming an angle of approximately 135° at the apex

ROSTRUM: apex

R : Rounded; top of apex rounded

P : Pointed; tip of apex pointed

KEEL: present

Y : Yes; dorsal keel on carapace present

N : No; no dorsal keel on carapace

1st SEGMENT ANTENNULAR PEDUNCLE: lobe orientation

F : Forward; lobe on distal margin directed forward

O : Outward; lobe on distal margin with apex curved and directed towards outer margin

U : Upward; lobe on distal margin directed upward at 90° to surface and/or directed upward and pointing backward

1st SEGMENT ANTENNULAR PEDUNCLE: lobe apex shape

S : Simple; and of lobe simple pointed
B : Bifid; end of lobe with 2 points

2nd SEGMENT ANTENNULAR PEDUNCLE: lobe or spine

L : Lobe; a large rounded lobe on distal margin
NL : No lobe; no lobe or spine on distal margin
S1 : One spine; one small spine on inner distal margin
S2 : Two spines; one small spine on outer distal margin and one large spine on inner distal margin

ANTENNAL SCALE: lateral spine length

.25 : Lateral spine is approximately ¼ length of scale
.5 : Lateral spine is approximately ½ length of scale

DENTICLES: number

Number listed represents number of denticles on each side of carapace

ABDOMINAL SPINES: segment

N : No spines on any abdominal segment

Number listed represents number of abdominal segment on which dorsal spine occurs

	E. gibboides 286	E. mutica 288	E. pacifica 290	E. recurva 294
ROSTRUM: length	M	M	S	M
ROSTRUM: shape	Ns	Nt	Ot	Nt
ROSTRUM: apex	P	P	P/R	P
KEEL: present	Y	Y	N	Y
1st SEG. ANT. PED.: lobe orientation	O	F	F	U
1st SEG. ANT. PED.: lobe apex shape	S	B	S	♂S ♀B
2nd SEG. ANT. PED.: lobe or spine	L	NL	S1	S2
ANT. SCALE: lat. spine length	.5	.5	.25	.5
DENTICLES: no.	1	2	1	2
ABD. SPINES: seg.	3	N	N	N
SIZE: mm	♂ 22 ♀ 27	10-15	♂22 ♀ 25	10-15

KEY GROUP 4 (KG 4)

KEY TO THE SPECIES OF *Thysanoessa*

EYES: shape

R : Rounded
C : Constricted

THORACIC LEGS: length

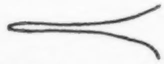
Eq : Equal; all legs approximately the same size, although sometimes 2nd pair is slightly longer than the others
2L : 2nd pair of legs obviously longer than the others

ROSTRUM: length

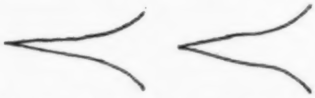
L : Long; more than ½ length of 1st segment of antennular peduncle

ROSTRUM: shape

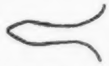
1 : Rostrum narrow and straight from frontal plate to apex



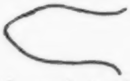
2 : Rostrum narrow but forming a triangle from frontal plate to apex



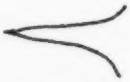
3 : Rostrum narrow, forming a somewhat lanceolate shape



4 : Rostrum broad, forming a somewhat lanceolate shape



5 : Rostrum narrow, with pointed tip at apex



ROSTRUM: apex

R : Rounded; tip of apex rounded

P : Pointed; tip of apex pointed

KEEL: present

Y : Yes; dorsal keel on carapace present

N : No; no dorsal keel on carapace

DENTICLES: number

N : No; no denticles on carapace

Number listed represents number of denticles on each side of carapace

Ist SEGMENT ANTENNULAR PEDUNCLE: spines, setae

Bs : Barbed spines; two large barbed spines on inner distal margin

Rs : Recurved spines; many recurved spines on dorsal surface

Se : Setae; setae or several small barbed spines on inner distal margin

SPINES: segment

N : No; no spines on any abdominal segment

Number listed represents number of abdominal segment on which dorsal spine occurs

KEEL: segment

N : No; no keel on any abdominal segment

Number listed represents number of abdominal segment on which keel occurs

	EYES: shape	THOR. LEGS: length	ROSTRUM: length	ROSTRUM: shape	ROSTRUM: apex	KEEL: present	DENTICLES: number	1st SEG. ANT. PED.: spines, setae	SPINES: segment	KEEL: segment	SIZE: mm
T. inermis ♂ 332	R	Eq	L	4	P	N	N	Rs	5&/6	N	25
T. inermis ♀ 332	R	Eq	L	5	P	N	N	Se	5&/6	N	25
T. raschii 344	R	Eq	L	♂4 ♀2	R P	N	1	Se	N	N	20-25
T. spinifera 346	R	Eq	L	2	P	Y	N	Se	4-6	1-6	20 38
T. gregaria 328	C	2L	L	♂3 ♀2	R P	Y	1	Bs	N	N	11-16
T. inspinata 336	C	2L	L	♂1 ♀5	P	Y	1	Bs	6	3-5	15-18
T. longipes 340	C	2L	L	♂1 ♀5	P	Y	1	Bs	3-6	3-5	24 30

KEY GROUP 5 (KG 5)

KEY TO THE SPECIES OF *Nematoscelis*

ROSTRUM: length

S : Short; less than ½ length of 1st segment of antennular peduncle

L : Long; more than ½ length of 1st segment of antennular peduncle

ROSTRUM: shape

Ns : Narrow straight; rostrum narrow and straight from frontal plate to apex

Nt : Narrow triangular; rostrum narrow but forming a triangle from frontal plate to apex

ROSTRUM: apex

R : Rounded; tip of apex rounded

P : Pointed; tip of apex pointed

EYE: upper > lower

Y : Yes; upper lobe of constricted eye larger than lower lobe

N : No; upper lobe of constricted eye smaller than lower lobe

KEEL: present

Y : Yes; dorsal keel on carapace present

N : No; no dorsal keel on carapace

ABDOMINAL SPINES: present

Y : Yes; spines present on abdominal segments

N : No; no spines on any abdominal segment

ROSTRUM: length	ROSTRUM: shape	ROSTRUM: apex	EYE: upper > lower	DENTICLE: present	KEEL: present	ABD. SPINES: present	SIZE: mm	
L-S	Nt	R	N	N	Y	N	20-25	♂ *N. difficilis* (typical form) 306
L	Ns	P	N	N	Y	N	22-25	♀ *N. difficilis* (typical form) 306
L	Ns/Nt	R/P	N	Y	Y	N	15-19	*N. difficilis* (denticled form) 306
S	Nt	P	Y	N	Y	N	15-21	*N. tenella* 310

KEY GROUP 6 (KG 6)

KEY TO THE SPECIES OF *Stylocheiron*

ROSTRUM: length

S : Short; less than ½ length of 1st segment of antennular peduncle

M : Medium; approximately ½ length of 1st segment of antennular peduncle

L : Long; more than ½ length of 1st segment of antennular peduncle

ROSTRUM: shape

Ns : Narrow straight; rostrum narrow and straight from frontal plate to apex

Nt : Narrow triangular; rostrum narrow but forming a triangle from frontal plate to apex

Bt : Broad triangular; rostrum and frontal plate wide, forming an angle of approximately 90° at the apex

ROSTRUM: apex

R : Rounded; tip of apex rounded

P : Pointed; tip of apex pointed

1st SEGMENT ANTENNULAR PEDUNCLE: number of spines

1-2 : 1-2 large barbed spines on the inner distal margin

2-3 : 2-3 large barbed spines on the inner distal margin

KEEL: present

Y : Yes; dorsal keel or carapace present

N : No; no dorsal keel on carapace

3rd THORACIC LEG: true chela

Y : Yes; last segment of the elongated third leg terminating in a pseudochela

SPINES: present

N : No; no spines on any abdominal segment

KEEL: segments

N : No; no keel on any abdominal segment

Number listed represents number of abdominal segment on which keel occurs

ROSTRUM: length	ROSTRUM: shape	ROSTRUM: apex	1st SEG. ANT. PED.: number of spines	KEEL: present	3rd THOR. LEG: true chela	SPINES: present	KEEL: segments	SIZE: mm		
S	Bt	P	1-2	Y	Ps	N	N	6.5-9.5	♂ *S. longicorne*	318
M	Nt/Ns	P	1-2	Y	Ps	N	N	13	♀ *S. longicorne*	318
L	Bt	P	2-3	Y	Y	N	N	20-25 25-30	*S. maximum*	320

DIAGNOSES AND ILLUSTRATIONS OF THE EUPHAUSIACEA

Genus Bentheuphausia G.O. Sars, 1885

SYNONYMY AND REFERENCES

Bentheuphausia G.O. Sars, 1885 (1)
Banner, 1950 (2)
Boden et al., 1955 (3)
Brinton, 1975 (4)

CHARACTERIZATION (1, 2, 3, 4)

Eyes. Reduced in size; pigments irregular and imperfectly developed.

Antennules. Peduncles short and robust; flagella extremely long.

Maxillules. Palp small but composed of 3 segments.

Maxillae. Composed of 5 segments.

Mandibles. Strongly developed with expanded molar portion and palp well developed.

Thoracic gills. Very fully developed; the 3 posterior pairs complex and the last pair the largest.

Abdomen. Pleopods of the male not modified as copulatory organs.

Uropods. Exopod with transverse suture ¼ from distal end.

TAXONOMIC NOTES Major characteristics which distinguish Bentheuphausia from other genera are the unusual structures of the oral parts (mandibles, maxillules and maxillae), the complex gill structure and the presence of 8 fully developed thoracopods (4). Banner (2) states that the eyestalk has a papilla, although this is not mentioned by (1), (3) or (4), and a true papilla cannot be seen on any of our specimens. There are no photophores or luminescent organs.

Family and genus are represented by only one species.

ECOLOGICAL NOTES A true bathypelagic genus, supported by the imperfect development of the eyes.

DISTRIBUTION See distribution for the only species, B. amblyops.

Bentheuphausia amblyops G.O. Sars, 1885

SYNONYMY AND REFERENCES

Bentheuphausia amblyops G.O. Sars, 1885 (1)

Banner, 1950 (2)
Boden et al., 1955 (3)
Brinton, 1962 (4)
Brinton, 1975 (5)
Einarsson, 1942
Hansen, 1910
Hansen, 1912
Illig, 1930 (6)
Komaki, 1960 (7)
Mauchline, 1980 (8)
Mauchline and Fisher, 1969 (9)
Nemoto and Saijo, 1968 (10)
Ponomareva, 1963

Thysanopoda (?) amblyops G.O. Sars, 1883

CHARACTERIZATION (1, 2, 3, 5, 7)

Rostrum. Short and rounded.

Carapace. Posterolateral margin slightly serrated in young specimens (10-15 mm). Cervical groove moderately developed; no denticles on lateral margin.

Eyes. Reddish brown; facets imperfectly developed; small knob-like projection located on upper edge of peduncle over cornea.

Antennules. Peduncle thick and robust. 1st inner segment bears a triangular lobe on upper inner margin. 2nd and 3rd segments of peduncle a little thicker in female and 3rd segment considerably thicker in male. Basal segment of flagellum longer in male than in female and bears numerous rows of sensory hairs which are separated longitudinally by a hairless zone. Fewer rows of hairs in female, and they are carried only on the upper side of the flagellum.

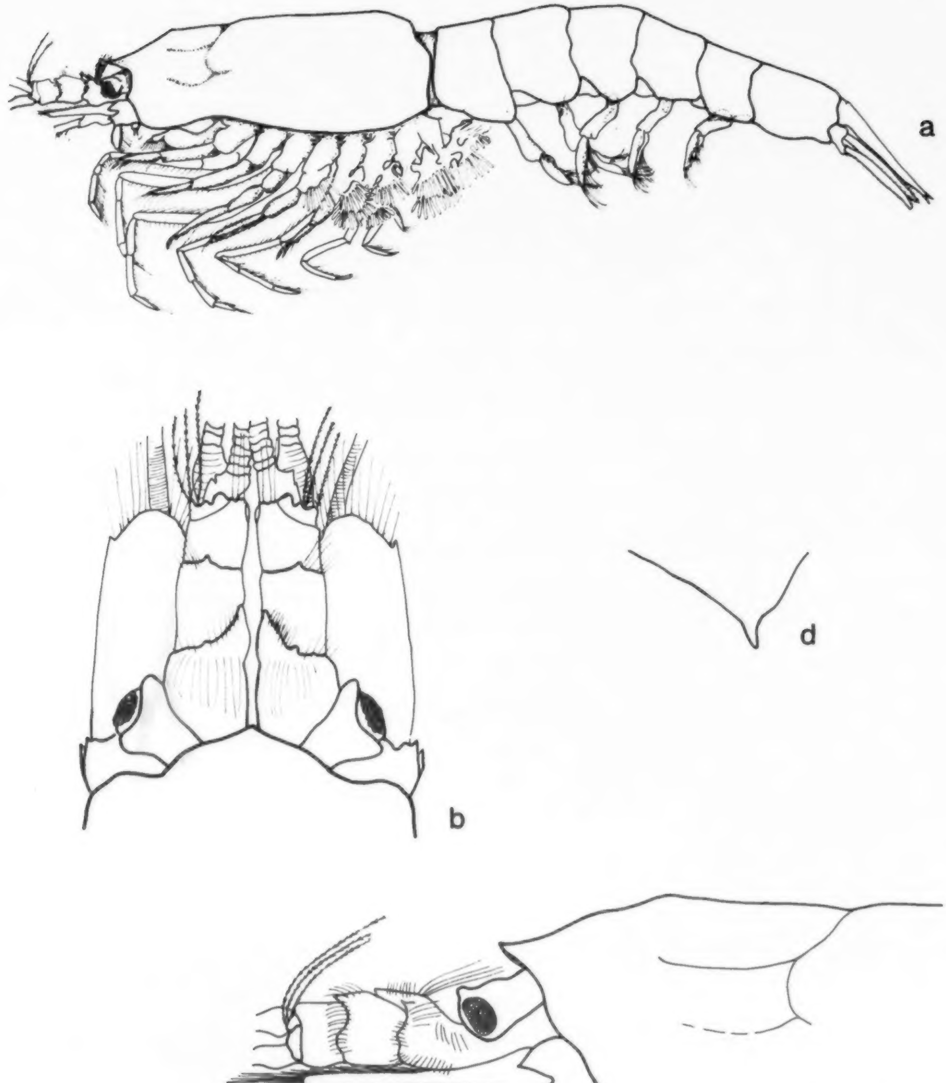
Antennae. Peduncle slightly shorter than scale. Scale approximately same length as antennular peduncle, with a broadly rounded apex and small spine on outer margin.

Abdomen. Endopod of 1st pleopod not modified as petasma in male, but basis carries 1-6 spines. 6th abdominal segment 1.3 times longer than deep. Preanal spine robust and simple-pointed. No dorsal keels or spines.

ECOLOGICAL NOTES Species lacks bioluminescent organs (4, 5). However, the stomach often contains pigments of plant origin (10). Records show there are no day-night differences in vertical distribution, suggesting it does not perform a diurnal vertical migration (4, 8). An important prey item of demersal fishes, and considered a filter feeder and/or omnivore, consuming diatoms, tintinnids, radiolarians, medusae, chaetognaths and crustaceans (8).

DISTRIBUTION Bathypelagic; widely distributed in the Pacific, Atlantic and Indian Oceans. One of three of the most widely distributed euphausiid species (cf. Thysanopoda cornuta and Stylocheiron maximum). Generally occurs between 1000 and 5000 m but can be found at lesser depths. Banner (2) reported it from British Columbia; it has been found in all areas of the Pacific where depths are greater than 1000 m. It is generally associated with a temperature range of 3-9°C (2, 3, 4, 5, 9).

Figure. a. lateral view, female (7); b. dorsal view, anterior end, female (6); c. lateral view, anterior end, female (6); d. preanal spine, female (6).



Bentheuphausia amblyops

Genus *Euphausia* Dana, 1852

SYNONYMY AND REFERENCES

Euphausia Dana, 1852
Banner, 1950 (1)
Boden et al. 1955 (2)
Brinton, 1975 (3)
Hansen, 1905b
Hansen, 1911 (4)
Hansen, 1912 (5)
John, 1936 (6)
Ponomareva, 1963 (7)
Zimmer, 1904

CHARACTERIZATION (1, 2, 3, 5, 7)

Rostrum. Variable.

Carapace. Variable.

Eyes. Round, no constrictions.

Antennules. Basal segment of peduncle frequently bears small lobe (lappet) dorsally on distal end. Flagella elongate with numerous segments.

Maxillae. Broad terminal segment and small exopod.

Thoracopods. Similar in structure, none conspicuously elongated; 6th similar in length to 5th; 7th and 8th rudimentary, consisting of short unjointed setose processes.

Petasma. No spiniform process; terminal process has a heel-like lateral extension at base. Lateral process has 1-3 teeth. Proximal process well developed.

TAXONOMIC NOTES Hansen (4) separated species into 4 groups, using number of lateral denticles on carapace and abdominal segments with dorsal spines (2, 3):

Group a. 2 pairs of lateral denticles on carapace. No dorsal process on 3rd to 5th abdominal segments (*E. recurva*, *E. mutica*).
Group b. A single pair (rarely none) of lateral denticles on carapace. No dorsal process on 3rd to 5th abdominal segment (*E. pacifica*).
Group c. A single pair of lateral denticles on carapace. A protruding, acute, dorsal process on 3rd abdominal segment only (*E. gibboides*).
Group d. A single pair of lateral denticles on carapace. Well-developed dorsal process on 3rd abdominal segment and conspicuous dorsal denticles or processes on 4th and 5th segments (no local representative species).

These groups are generally still retained (2) although (6) agrees with (4) that groups a and d are natural while b and c are not. Brinton (3) reconstituted them as three more natural groups.

Thirty-one species have been recorded (3); four occur locally.

DISTRIBUTION This genus is the largest of the euphausiids; 8 species are endemic to antarctic or subantarctic waters although no species are found in the Arctic Ocean and only one, *E. pacifica*, in subarctic waters (2).

Euphausia gibboides Ortmann, 1893

SYNONYMY AND REFERENCES

Euphausia gibboides Ortmann, 1893
Boden et al., 1955 (1)
Brinton, 1962 (2)
Brinton & Wyllie, 1976 (3)
Hansen, 1911
Hansen, 1912 (4)
Mauchline, 1980 (5)
Mauchline and Fisher, 1969 (6)
Ponomareva, 1963 (7)

CHARACTERIZATION (1, 3, 4)

Rostrum. Basal part broadly triangular, rather abruptly changing to narrow straight distal part, ending in acutely pointed tip. It reaches approximately halfway along 1st segment of antennular peduncle.

Carapace. Single denticle on lateral margin.

Eyes. Large and round.

Antennules. Inner distal margin of 1st segment of peduncle produced into long lobe projecting forward and upward for its 1st half, then tapering abruptly and bending sharply outwards. Upper distal margin of 2nd segment concave but projects as lobe over proximal end of 3rd segment. 3rd segment has high dorsal keel with distal edge produced dorsally as a tooth.

Antennae. Scale reaches to about the middle of 3rd segment of antennular peduncle. Spiniform process on outer side is not quite ½ as long as scale.

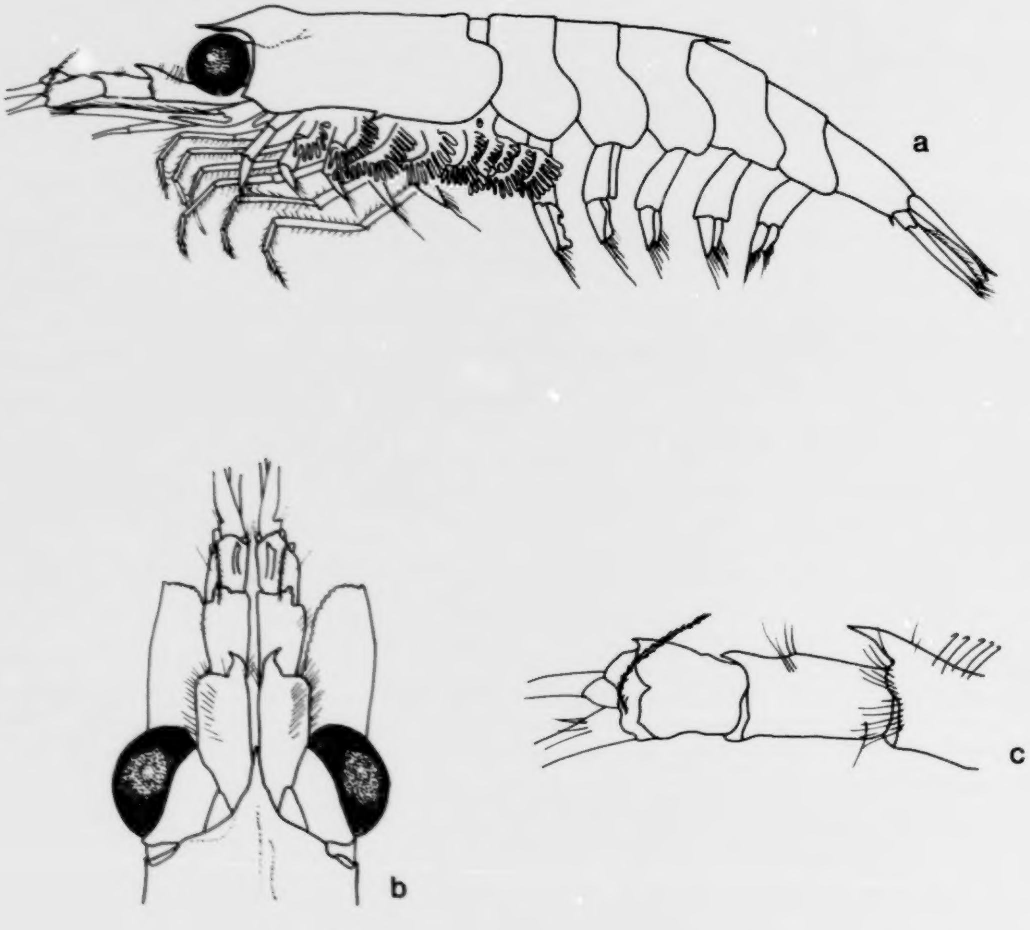
Abdomen. Upper posterior edge of 3rd abdominal segment bears sharp spine.

Petasma. Terminal process has moderately long foot with short thick heel proximally, and long slender curved tapering distal part. Proximal process long, slender and curved with robust base tapering gradually toward the end, then expanding into broad, oblong, distally rounded plate with long slender tooth at base. Small tubercle lies on inner basal side of median lobe. Median lobe somewhat broadened, tapering to a moderately acute tip. Lateral process thick at base, tapering and curved distally. Setiferous lobe broad and moderately setose on distal inner and terminal margins.

TAXONOMIC NOTES Vertical angle at which rostrum is projected varies, from rising uniformly to rising abruptly (2). This and 2 other species, *E. fallax* and *E. sanzoi*, form the "*E. gibboides* group", 3 very closely related species which can be differentiated by the petasma, the abdominal armature and the distal keel on the 3rd segment of the antennular peduncle. There have been some question and confusion about the valid identities of these 3 species, largely resolved by (3) and by Knight's larval studies.

DISTRIBUTION Temperate and tropical areas of Atlantic and Pacific. Previous records in Indian are probably the closely related species *E. sanzoi* (2, 5). Generally it occupies a belt between 30°N and 40-45°N (2). It occurs between 280-700 m during the day and above 280 m at night. Larvae and juveniles are usually above 280 m (1, 2, 6, 7).

Figure. a. lateral view, male (1); b. dorsal view, anterior end, male (4); c. antennular peduncle (4).



Euphausia gibboides

Euphausia mutica Hansen, 1905

SYNONYMY AND REFERENCES

Euphausia mutica Hansen, 1905b (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Hansen, 1910 (5)
Hansen, 1912
Mauchline and Fisher, 1969 (6)
Ponomareva, 1963 (7)

CHARACTERIZATION (1, 2, 3)

Rostrum. Extending about midway of 1st segment of antennular peduncle, narrowly triangular and ending in acute point.

Carapace. 2 denticles on each lateral margin.

Eyes. Medium sized, round, brown or blackish brown.

Antennules. Small bifid lobe on 1st segment of peduncle; it is directed forward, upward and outward, with terminal spiniform processes straight and not curved downward. The lobe angles somewhat downward, just anterior to the eye. This is best seen if specimen is viewed from slightly below direct lateral (3). 2nd segment on large specimens may have low hump with forward directed spine at distal outer margin. Low rounded keel or ridge on 3rd segment present.

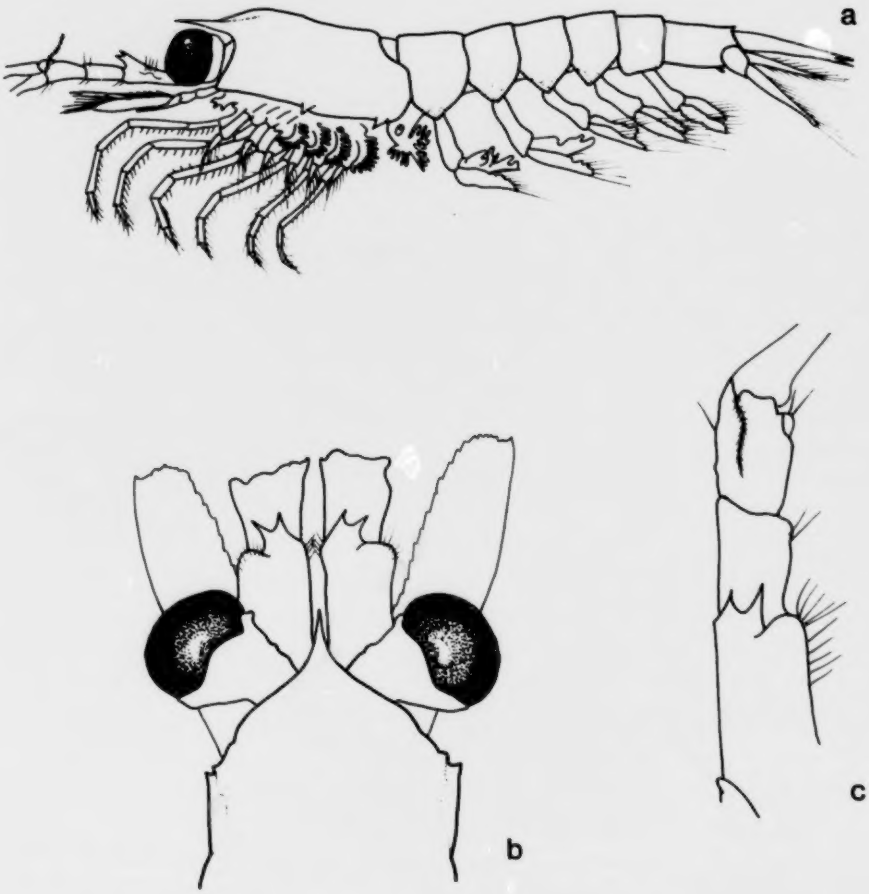
Abdomen. Preanal spine broad, with 3 teeth on the posterior margin in males, and 4 in females. No dorsal spines or keels.

Petasma. Terminal process long, robust and curved distally, tapering to an acute tip. A small spine present on the distal concave margin. Proximal process curved, ending in a large rounded plate with a protuberance on its inner side. Lateral process curved and acute. Median lobe narrows then widens distally, ending in an acute, sharply curved, chitinized tip.

TAXONOMIC NOTES This species is similar to *E. recurva*, but can be distinguished by relatively smaller eyes, the forward projecting lobe on the 1st segment of the antennular peduncle (*T. recurva* is upward projecting), no lobes or spines on the distal margin of the 2nd segment of the antennular peduncle (*T. recurva* has two spines) and the low rounded keel on the 3rd segment of the antennular peduncle (*T. recurva* is high, notched anteriorly).

DISTRIBUTION Occurs in the Atlantic, Pacific and Indian Oceans. In North Pacific it is more widely distributed than the allied *E. recurva* but occupies the same area in the NE Central Pacific. It is present between about 40°N and 25°N, and between 10°S and 20-30°S in the Eastern Pacific. In the North Pacific it is associated with the temperature range 16-25°C at 100 m. It lives at the same approximate depths as *E. recurva*, i.e. 140 to 700 m during the day and above 100 m at night (3, 6).

Figure. a. lateral view, male (2); b. dorsal view, anterior end, male (original); c. antennular peduncle (5).



Euphausia mutica

Euphausia pacifica Hansen, 1911

SYNONYMY AND REFERENCES

Euphausia pacifica Hansen, 1911
Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962
Brinton & Wyllie, 1976 (3)
Esterly, 1914
Fukuchi, 1977 (4)
Fulton and LeBrasseur, 1985 (5)
Gilfillan, 1970 (6)
Hansen, 1912
Hansen, 1915 (7)
Heath, 1977 (8)
Komaki, 1960 (9)
Lasker, 1966 (10)
Mackie and Mills, 1983 (11)
Mauchline, 1980 (12)
Mauchline & Fisher, 1969 (13)
Ponomareva, 1963 (14)
Regan, 1968 (15)
Smiles & Pearcy, 1971 (16)
Vermeer, 1981 (17)
Vermeer, 1985 (18)
Vermeer et al., 1985 (19)

CHARACTERIZATION (1, 2, 3, 9)

Rostrum. No true rostral process; frontal process obtusely triangular.

Carapace. Strong denticle near middle of lateral margin. No dorsal keel.

Eyes. Large and round.

Antennules. Upper margin of 1st segment of peduncle has low, sharp forward-directed tooth which projects over 2nd segment; row of thick recurved setae found dorsally. 2nd segment longer than 3rd and sometimes bears toothlike process similar to, but smaller than, that of 1st. 3rd segment bears low dorsal keel.

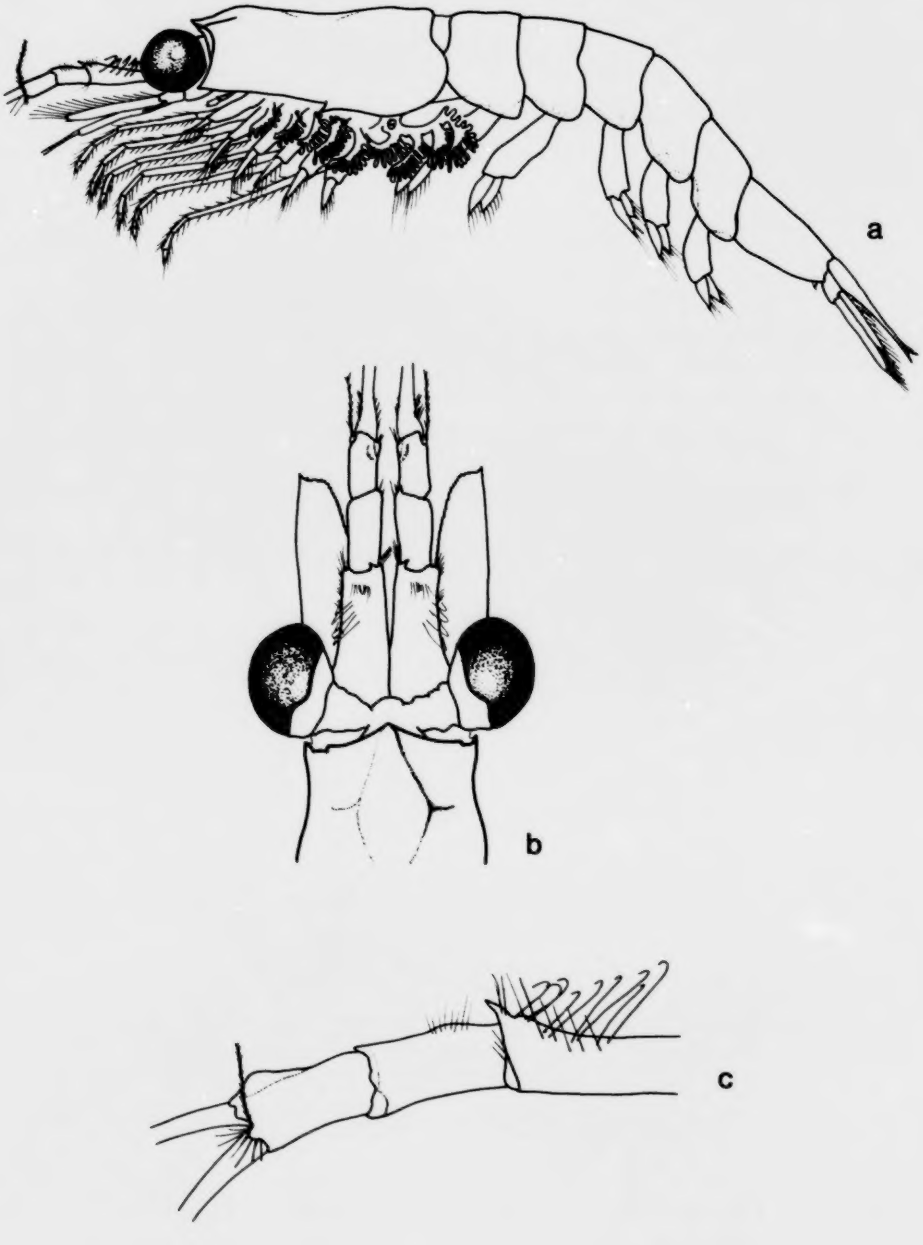
Abdomen. No dorsal spines or keels; 6th segment about 1.5X as long as 5th.

Petasma. Terminal process has rather long foot and short but pronounced and angular heel. Distally process is first constricted, then broadens to flat irregularly shaped blade lying at angle to main process. Much shorter proximal process inflated at base, ending distally in large oblong plate strongly bent posteriorly at right angles to the rest of process. Near base is small then rounded projection. Lateral process strongly hooked and tapers to point distally. Median lobe appears crested and may have accessory process. If present, it arises from median lobe near hook of lateral process and is small, simple and styliform. Auxiliary lobe slender. Setiferous lobe has prominent pouch on posterior surface.

ECOLOGICAL NOTES Distribution of this species in B.C. coastal waters is not limited by salinity and temperature except in shallow surface waters (6, 15). During a 4 year growth rate study off Oregon (16) found larvae most abundant between October and December, with no major concentrations during winter or spring. They also concluded that *E. pacifica* lives about 1 year and reaches 22-24 mm total length. Larvae were found from May to September in the Strait of Georgia and Saanich Inlet by (8), who concluded that although *E. pacifica* reached maturity in 1 year and reproduced, some adults lived up to 2 years but did not breed in the second year. However, (14) concluded that this species lives 2 years from a study in the NW Pacific but did not indicate if breeding took place in the second year. Feeding, growth, respiration and carbon utilization of are discussed by (10). Feeding mostly at night, they are filter feeders, consuming detritus, algae, chaetognaths, echinoderms and crustaceans (13). They, in turn, are important food items for blue, fin, humpback and right whales, and squid, decapods and birds (12, 17, 18, 19). Estimates of concentrations as high as 10,000/m^3 just above the oxycline at about 150 m in Saanich Inlet have been made from visual observations from a submersible (11).

DISTRIBUTION Restricted to the North Pacific. Populations are densest in the North Pacific Drift, Aleutian Current and off southeast California in the California Current. It is the dominant euphausiid within 300-400 miles off the coast of Pt. Conception, California (2), and is very abundant northward to the Bering Sea (1). Banner (1) and (5) found this species most common in the upper 300 m during the spring in British Columbia. However, (4) found no individuals in the Bering Sea or in the area south of the Alaska Peninsula and Aleutian Islands.

Figure. a. lateral view, female (2); b. dorsal view, anterior end, female (7); c. antennular peduncle, female (7).



Euphausia pacifica

Euphausia recurva Hansen, 1905

SYNONYMY AND REFERENCES

Euphausia recurva Hansen, 1905b (1)

Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Esterly, 1914
Hansen, 1912 (5)
Mauchline, 1980 (6)
Mauchline and Fisher, 1969 (7)
Ponomareva, 1963

CHARACTERIZATION (1, 2, 4, 5)

Rostrum. Narrow, triangular, pointed rostrum extending about midway of 1st segment of antennular peduncle or to anterior limit of eyes.

Carapace. Gastric region keeled; 2 denticles on each lateral margin.

Eyes. Medium sized, round, with no constrictions.

Antennules. Lobe of 1st segment of peduncle sexually dimorphic. Males: hollowed, oblong-triangular plate, upward and/or slightly backward projecting, nearly reaching upper limit of eye; base half as broad as segment, tapering to pointed single tip. Females: slightly hollowed plate, only slightly recurved, and shorter; distally forming 2 triangular, acute processes, with base little more than half as broad as segment. Following 2 segments thicker in males than in females. 2nd segment of peduncle in both sexes has short forward-directed conical process or tubercle on outer distal margin and longer, more acute process on inner distal margin. 3rd segment in both sexes has high keel ending distally in acute tooth.

Antennae. Scale reaches to about middle of 3rd segment of antennular peduncle.

Abdomen. No dorsal spines or keels.

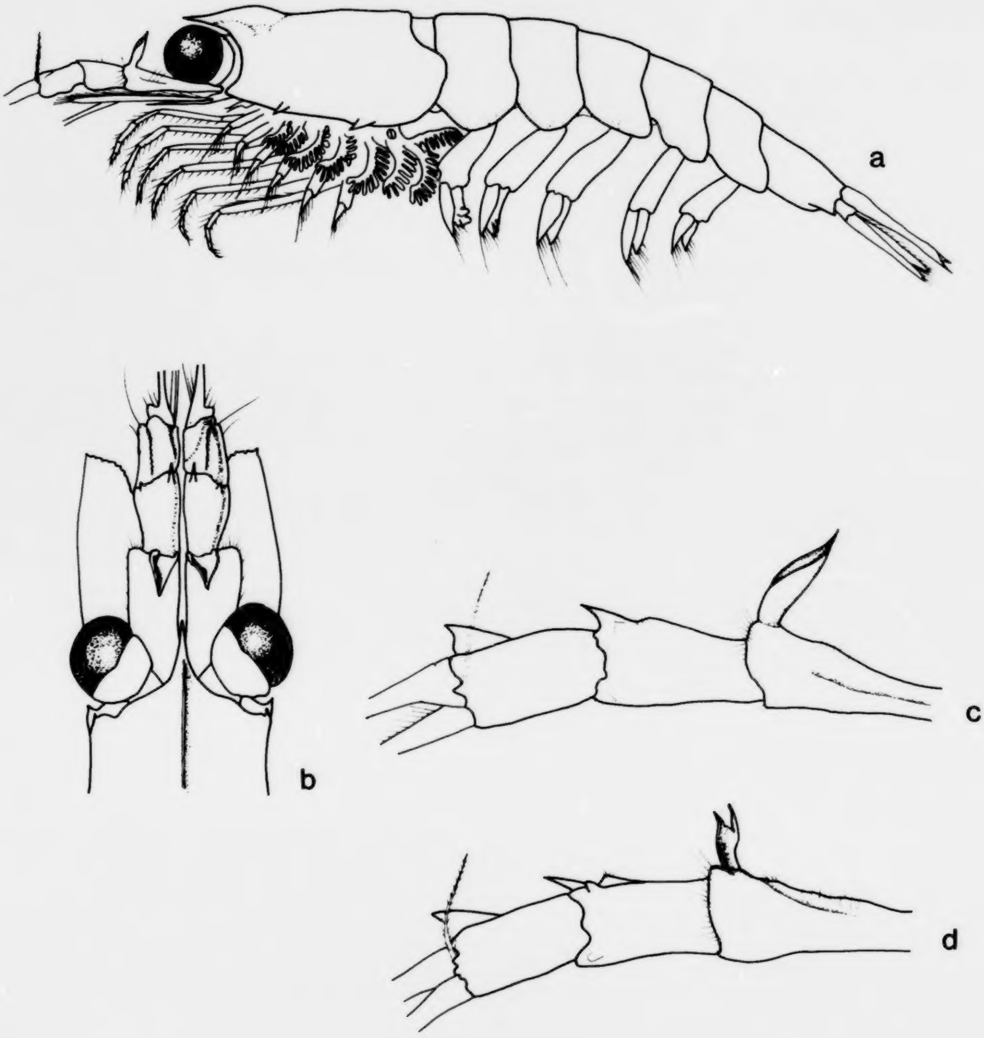
Petasma. Moderately long and thick terminal process has well-developed foot and long heel, evenly curving distally and abruptly tapering to point. Thick proximal process has inflated base and flattened, expanded variable-shaped terminal part. Median lobe has narrow neck, expanding distally into inverted triangle. Lateral process has thick base and slender, curved distal part. Auxiliary lobe very long. Setiferous lobe has partly truncate end with 6-7 setae and smooth, parallel lateral margins.

TAXONOMIC NOTES This species is similar to *E. mutica*; see discussion of differences under *E. mutica*.

ECOLOGICAL NOTES *E. recurva* aggregates in patches and breeding swarms, and is preyed upon by blue, fin, humpback, sei and Bryde's whales, and planktivorous fish (6, 7). Food items include detritus, tintinnids, radiolarians and crustaceans (6).

DISTRIBUTION Occurs in the Atlantic, Pacific and Indian Oceans, with similar distribution in the North Pacific to *E. mutica*. It has been caught throughout the Central North Pacific, occurring between 40°N and 20°N, and between 20°S and 40°S. Not reported from British Columbia, but recorded south to California. It occurs between 140 and 700 m depth during day and above 100 m at night (2, 4, 6).

Figure. a. lateral view, male (2); b. dorsal view, anterior end, male (5); c. antennular peduncle, male (2); d. antennular peduncle, female (2).



Euphausia recurva

Genus *Nematobrachion* Calman, 1905

SYNONYMY AND REFERENCES

Nematobrachion Calman, 1905 (1)
Banner, 1950 (2)
Boden et al., 1955 (3)
Brinton, 1975 (4)
Hansen, 1910
Hansen, 1911 (5)
Hansen, 1912 (6)
Mauchline and Fisher, 1969 (7)

Nematodactylus Calman, 1896

CHARACTERIZATION (1, 2, 3, 4, 5, 6)

Carapace. With cervical groove; with or without denticles on lateral margin.

Eyes. Large and constricted; upper lobe larger than lower.

Antennules. Peduncle robust and similar in both sexes. Flagella long and slender.

Mandibles. Palp 3-segmented.

Maxillules. With or without pseudexopod.

Maxillae. Coxa and basis relatively broad.

Thoracopods. 1st and 2nd similar; dactyl of 2nd broad with short stiff setae. 3rd greatly elongate, without setae or spines, except for 5-6 harpoon-like spines on the dactyl. Merus has a sharp bend proximally. Posterior thoracopods small, decreasing in size posteriorly. 7th short but has all segments. Endopod of the 8th is absent; exopod normal.

Petasma. All lobes present and all processes present and well developed.

TAXONOMIC NOTES *Nematobrachion* differs from the other 3 genera with elongated 2nd and/or 3rd thoracopods (*Thysanoessa*, *Nematoscelis*, *Stylocheiron*) in that the antennular peduncle is similar in both sexes and the 7th thoracopod has all 5 segments (versus at most 2 in the female and lacking in the male). Keys to these 4 genera are given in (1). Keys to the species are in (3), (4), (5) and (6).

There are 3 species in this genus; 2 are found in our study area.

ECOLOGICAL NOTES The resemblance between the 3rd thoracopod of *Nematobrachion* and the 2nd of *Nematoscelis* (both have annulated harpoon-like spines at the ends) may suggest a close natural affinity between them (1).

DISTRIBUTION The species are found in the Pacific, Atlantic and Indian Oceans (7).

Nematobrachion boopis (Calman, 1896)

SYNONYMY AND REFERENCES

Nematobrachion boopis

Boden et al., 1955 (1)
Brinton, 1962 (2)
Brinton, 1975 (3)
Calman, 1905 (4)
Hansen, 1980
Hansen, 1910
Hansen, 1911
Hansen, 1912 (5)
Illig, 1930
Mauchline, 1980 (6)
Mauchline and Fisher, 1969 (7)
Ponomareva, 1963
W. Tattersall, 1939

Nematodactylus boopis Calman, 1896

CHARACTERIZATION (1, 3, 4, 5)

Rostrum. Short, broadly rounded frontal plate lacking true rostrum.

Carapace. Cervical groove and low keel, but no denticles on lateral margin.

Eyes. Upper lobe 1½-2X wider than lower. Region between dark brown-black lobes only slightly constricted, occupied by a broad, lightly pigmented band.

Antennules. Distal lobe of 1st segment of peduncle projects high above 2nd segment. 2nd projects over proximal part of 3rd as a feebly angular lobe. 3rd has a short low dorsal keel distally.

Antennae. Scale reaches to middle of 3rd segment of antennular peduncle. Apex rounded with a small tooth on outer distal margin.

Abdomen. 6th segment twice as long as deep. No dorsal spines or keels.

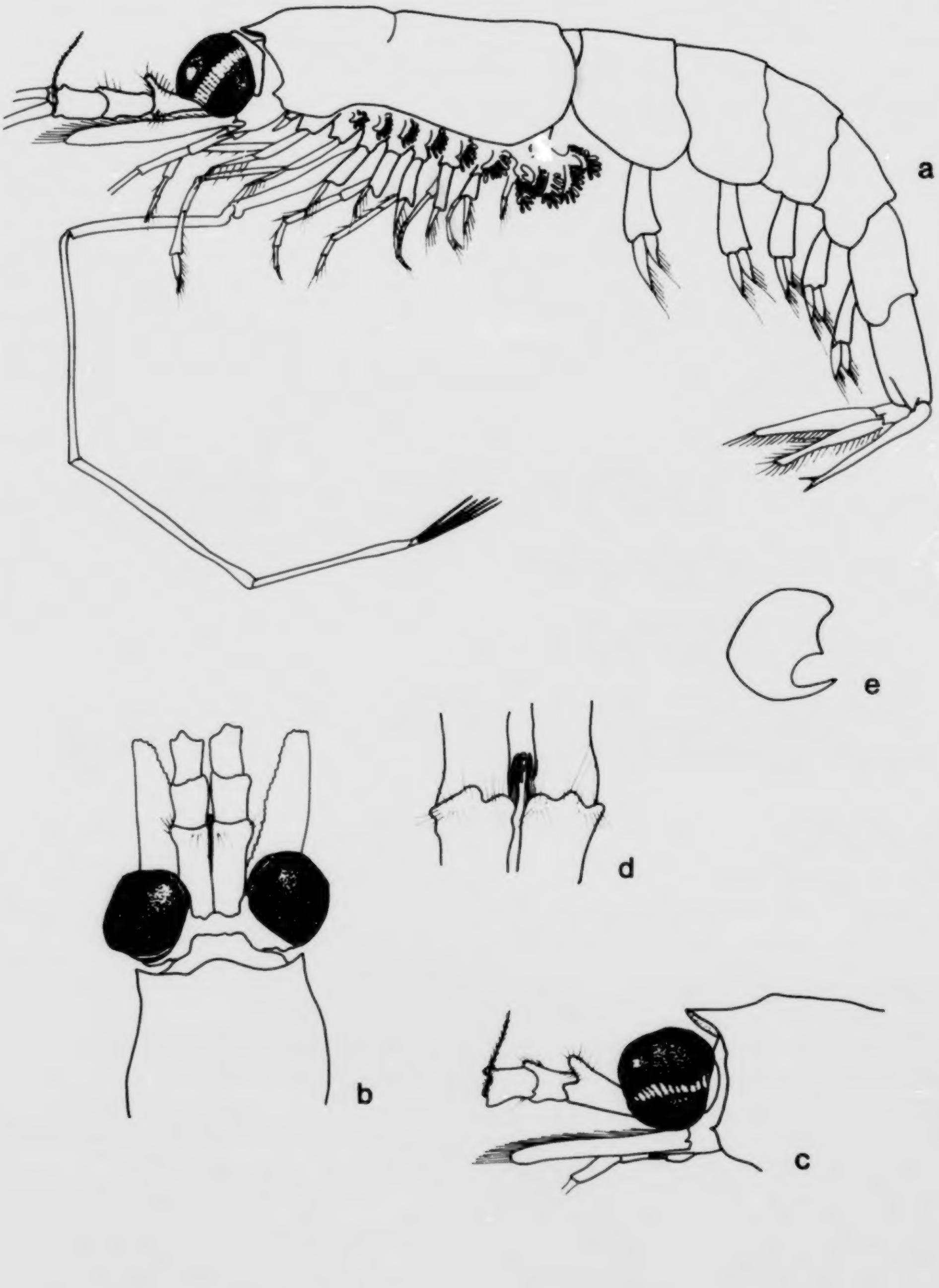
Petasma. Small, curved spiniform process. Terminal process broad at the base, then narrows, then expands into a large flat plate which may be emarginate distally. Small protuberance evident on the proximal process, which is long and slender, arcing to an acute hooked point. Slender lateral process curves distally to a short sharp hook. Additional process robust and strongly curved.

TAXONOMIC NOTES Extremely broad upper lobe of the eye and absence of a rostrum are diagnostic characters (3). Brinton (3) states that the 3rd segment of the antennular peduncle is slightly elevated but has no keel; our specimens agree with (1) and (5), who indicate that a short small keel is present. Calman (4) indicates the presence of a "distal tooth very minute" on the antennal scale, while (5) says this tooth is lacking; all our specimens bear this small tooth, so it is likely (5) either overlooked it or it was broken.

ECOLOGICAL NOTES Predatory feeder and is consumed by planktivorous fish (6). Does not perform vertical migrations (6).

DISTRIBUTION This mesopelagic species occurs in the Pacific, Atlantic and Indian Oceans. Widely distributed in the North and South Pacific occurring south of 40-42°N (2, 7). This typically mid-water species occurs at relatively shallow depths where the limits of its range impinge upon subarctic and subantarctic zones (2). Adults generally found below 400-500 m, and larvae and immatures below 100 m (1, 2).

Figure. a. lateral view, female (1); b. dorsal view, anterior end, male (original); c. lateral view, anterior end, female (original); d. distal end, 1st segment of antennular peduncle (original); e. preanal spine (original).



Nematobrachion boopis

Nematobrachion flexipes (Ortmann, 1893)

SYNONYMY AND REFERENCES

Nematobrachion flexipes

Banner, 1950 (1)
Broden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Calman, 1905
Fulton and LeBrasseur, 1984 (6)
Hansen, 1911
Hansen, 1912 (7)
Hansen, 1915
Illig, 1930
Mauchline, 1980 (8)
Mauchline and Fisher, 1969 (9)
Ponomareva, 1963
W. Tattersall, 1939

Stylocheiron flexipes Ortmann, 1893

Nematodactylus flexipes Calman, 1896

CHARACTERIZATION (1, 2, 4, 7)

Rostrum. Long and slender, projecting slightly upward then forward.

Carapace. Long low keel is slightly elevated at its midpoint. Denticle on the posterior third of the lateral margin.

Eyes. Upper lobe slightly wider than the lower.

Antennules. Distal lobe on 1st segment of the peduncle is truncated and does not overhang the 2nd segment. Long spine from outer concave margin of the 1st projects beyond the middle of the 2nd. Outer distal angle of the 2nd segment is produced into a process which is lamellar at the base but tapers to a spiniform process distally, directed forward, upward and outward over the 3rd. The 3rd increases in height distally, with a small keel or elevation.

Antennae. Scale reaches to about the middle of the 3rd segment of the antennular peduncle.

Abdomen. 3rd to 6th segments have dorsal spines; 3rd is the longest. Posterolateral angles of the 2nd to 5th pleura are rather acute, and the 5th is somewhat produced. Preanal spine simple in the male and bifid in the female. Exopod of the uropod armed dorsally with strong stiff setae.

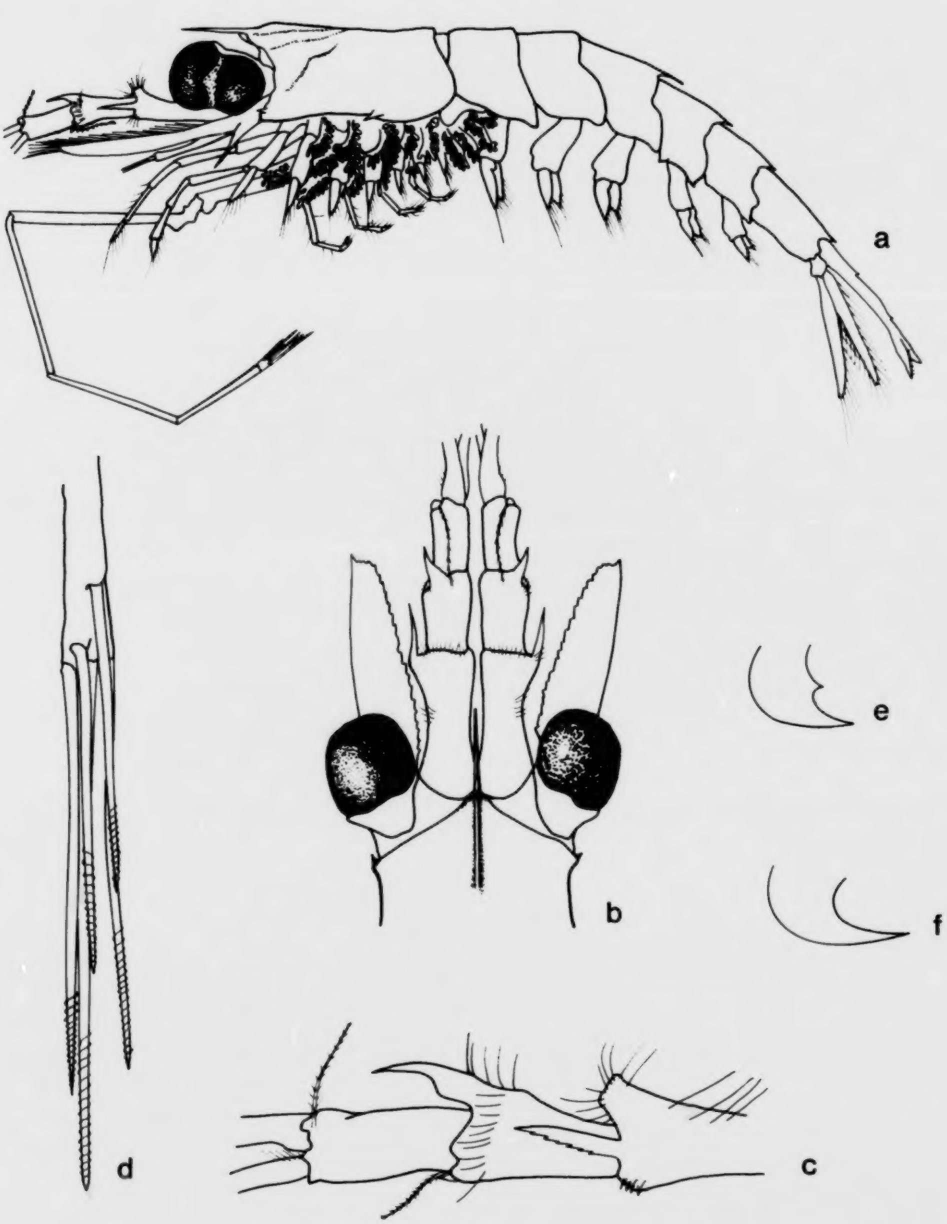
Petasma. Spiniform process moderately developed and slightly curved. Terminal process thick at the base, narrows medially, then expands to a flattened plate with a small raised portion distally. Proximal process has an expanded base and a slender, strongly curving shaft which ends in an expanded plate with a finely serrate margin. Lateral process moderately thick with a short, strongly recurved distal tip. Additional process oblong, sharply bent at the distal third, and tapers to a point. Median lobe thin and narrow. Auxiliary lobe fairly short. Setiferous lobe long, narrow and setose along the distal outer margin.

TAXONOMIC NOTES Both (1) and (2) note a conspicuous denticle on each lateral margin of the carapace, although (4) does not mention it and (7) states there are none. All of our specimens bear this denticle. The 3rd segment of the antennular peduncle increases in height distally but has no keel according to (4), although (1), (2) and (7) consider it keeled. In our larger specimens a short small keel is evident, but in smaller specimens the description agrees with (4). Brinton (4) does not mention a dorsal spine on the 6th abdominal segment, although all other authors do (1, 2, 7). We believe this is an oversight on Brinton's part, since he illustrates a small spine.

ECOLOGICAL NOTES Considered a predator, and has been found in the stomachs of planktivorous fishes (8).

DISTRIBUTION This species is rare but widespread in the Pacific, but also occurs in the Atlantic and Indian Oceans. In the Pacific it generally occurs south of 40oN, but has been caught off Alaska and British Columbia (6). Adults live between 280 and 700 m during the day, and above 280 m at night. Larvae and immatures occur above 280 m (3, 9).

Figure. a. lateral view, female (2); b. dorsal view, anterior end, male (6); c. antennular peduncle, female (2); d. distal end, 3rd thoracopod (original); e. preanal spine, female (original); f. preanal spine, male (original).



Nematobrachion flexipes

Genus Nematoscelis G.O. Sars, 1883

SYNONYMY AND REFERENCES

Nematoscelis G.O. Sars, 1883
Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1975 (3)
Costanzo and Guglielmo, 1980 (4)
Gopalakrishnan, 1975 (5)
Hansen, 1910
Hansen, 1911 (6)
Hansen, 1912
Hansen, 1915
Mauchline and Fisher, 1969 (7)
Nemoto, 1966 (8)
G.O. Sars, 1885 (9)
Zimmer, 1904

CHARACTERIZATION (1, 2, 3, 8, 9)

Rostrum. Variable.

Eyes. With transverse constriction, upper lobe smaller or larger than lower.

Antennules. Peduncles elongate and slender in females, and short and thick in males.

Mandibles. Palp very small.

Thoracopods. Terminal segment of the endopod of the 1st triangular shaped with brush-like bristles on the inner margin. Endopod of the 2nd very elongate, with bristles on the ultimate (or ultimate and penultimate) segments. 3rd, 4th, 5th and 6th short and thick. Endopod of the 7th is 2-segmented in the female and lacking in the male; the exopod is present in both sexes. 8th rudimentary, represented by a simple setose plate.

Petasma. Inner lobe possesses all 3 processes, but the spiniform process almost straight and parallel with the other 2. Lateral process never hooked and the additional process lacking.

TAXONOMIC NOTES Species in this genus lack specific structures on the antennular peduncle and are difficult to distinguish. 2nd thoracopods and shape of the eyes have been used to discriminate species (3, 5, 6). Hansen (6) divided the 6 species (N. lobata was described in 1916) into 2 groups based on the maxillules, spination of the 2nd thoracopods and number of segments of the 3rd to 6th thoracopods. Identification may be difficult, however, when the 2nd thoracopod is not intact. Alternatively, the relative size of the petasma and the shape of the thelycum are useful diagnostic features (4). The presence or absence of a carapace denticle is confusing due to the fact that all immatures in this genus have denticles which are not lost at exactly the same time of development among specimens.

There are 7 species in this genus; two are found locally.

ECOLOGICAL NOTES Eggs are carried externally by the female, attached to the thoracopods by a glutinous adhesive (3). Gopalakrishnan (5) discusses the biology and taxonomy of the 7 species, with keys to the furcilia larvae and adults.

DISTRIBUTION Species of this genus are widespread in the Atlantic, Pacific and Indian Oceans, and Mediterranean, East China and South China Seas (7).

Nematoscelis difficilis Hansen, 1911

SYNONYMY AND REFERENCES

Nematoscelis difficilis Hansen, 1911 (1)
Banner, 1950 (2)
Boden et al., 1955 (3)
Brinton, 1962 (4)
Brinton, 1967
Brinton and Wyllie, 1976
Esterly, 1914 (5)
Fulton and LeBrasseur, 1984 (6)
Gopalakrishnan, 1973 (7)
Gopalakrishnan, 1975 (8)
Hansen, 1915
Mauchline, 1980 (9)
Mauchline and Fisher, 1969 (10)
McLaughlin, 1965 (11)
Ponomareva, 1963
Sheard, 1953 (12)

Nematoscelis megalops
Ortmann, 1894 (in part)?

Nematoscelis microps
Ortmann, 1894 (in part)

CHARACTERIZATION (2, 3, 11)

Rostrum. Long, thin and straight in the female, tapering to a point; can be short to long, thin and triangular, and rounded at the apex in the male. Usually, however, it is short.

Carapace. Keel present; denticles sometimes present on the lateral margin.

Eyes. Transverse constriction above the middle, with upper lobe smaller than the lower.

Antennules. Distal margin of the 1st segment of the peduncle produced and setose, no lobes or protuberances. Spine on the outer distal margin. 2nd and 3rd segments unarmed.

Antennae. Scale reaches to the middle of the 3rd segment of the antennular peduncle.

Thoracopods. Propodus of the 1st has setae arranged in 3 rows. Both ultimate and penultimate segments of the endopod of the 2nd thoracopod bear spines. 3rd to 6th decrease in length, with 3 segments beyond knee.

Abdomen. No dorsal spines or keels.

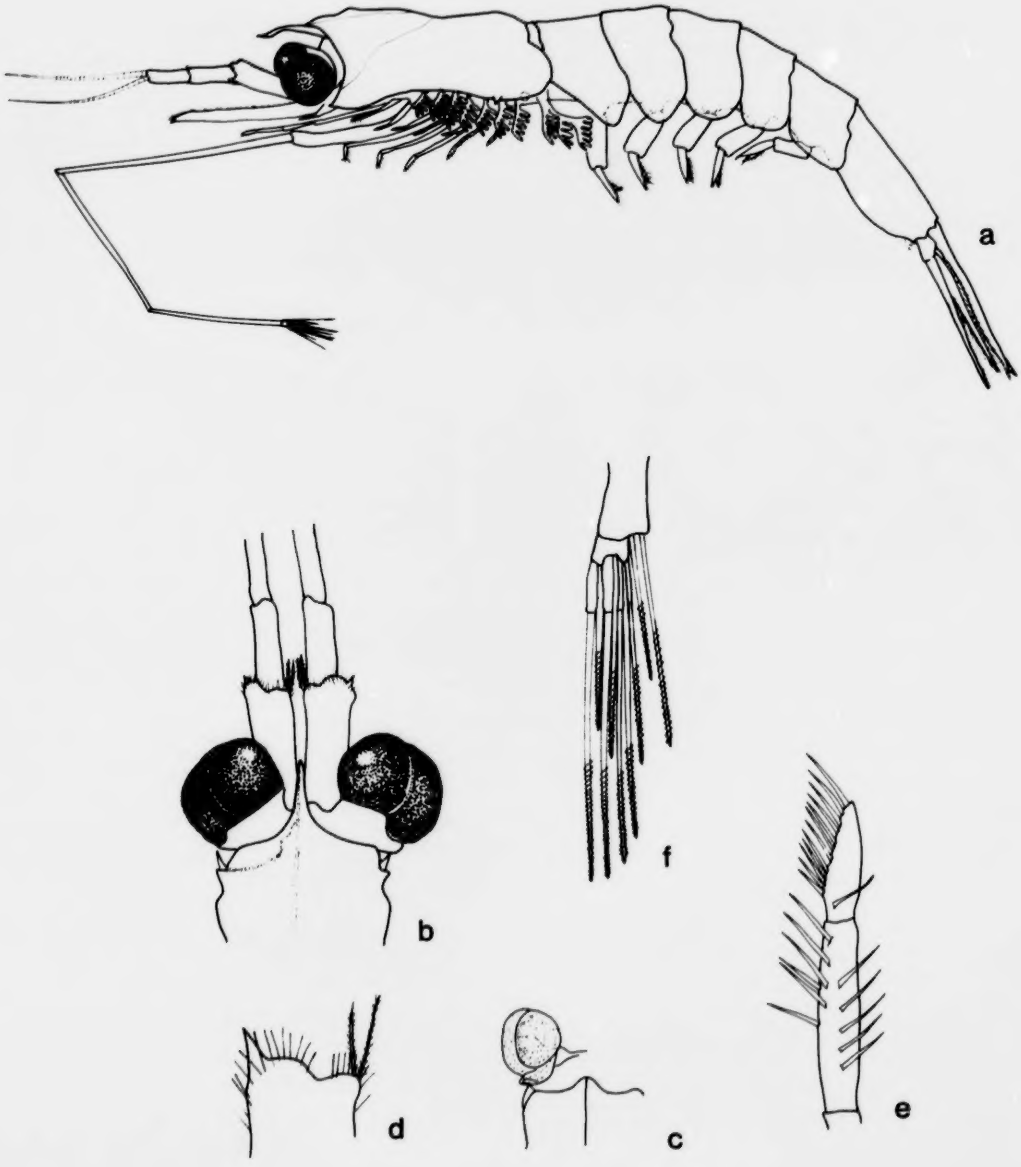
Petasma. Spiniform process slender, straight and about half as long as the terminal process. Base of the terminal process bent outward, while the slender distal part is set at an angle and has a strongly curved tip and about 25 serrations along the concave outer margin. Proximal process slightly shorter than the terminal process, with a finely serrated outer distal margin. Sinuous lateral process inserted well above the base of the median lobe and about as long as the spiniform process.

TAXONOMIC NOTES A form of this species having a prominent denticle on the lateral margin of the carapace in both subadults and adults has been reported for the NE Pacific. Characters for the "denticled form" which differ from the "typical form" are (a) the rostrum is usually long, (b) there is a prominent denticle on the carapace, and (c) the length is smaller (11). All other characters agree with the "typical form". The synonymies *N. megalops* and *N. microps* were given by (2), but because no descriptions or figures were given by Ortmann, it is not possible to assess the accuracy of this inclusion (3). *N. difficilis* is very similar to *N. megalops*, and can only be differentiated by the petasma. Fortunately their ranges do not overlap (4, 10).

ECOLOGICAL NOTES An important food item for whales, fish and birds (9). Gopalakrishnan has done extensive development and growth studies of this species from laboratory reared animals (7).

DISTRIBUTION Confined to the North Pacific between about 35° and 45°N, but extends south to 20°N in the California Current (10). Banner (2) found specimens to 51°N, from Oregon to British Columbia and in Queen Charlotte Sound. It has been recorded as a common species on the west coast of Canada (6). The record by (12) from southeastern Australia needs confirmation. Most common above 140 m and regularly found to 300 m, but rarely occurs above 50 m or above the thermocline where that feature exists (4).

Figure. a. lateral view, female (11); b. dorsal view, anterior end, female (5); c. rostrum, male (5); d. distal end, 1st segment of antennular peduncle (original); e. distal end, 1st thoracopod (7); f. distal end, 2nd thoracopod (3).



Nematoscelis difficilis

Nematoscelis tenella G.O. Sars, 1883

SYNONYMY AND REFERENCES

Nematoscelis tenella G.O. Sars, 1883

Boden et al., 1955 (1)
Brinton, 1962 (2)
Brinton, 1975 (3)
Gopalakrishnan, 1973 (4)
Gopalakrishnan, 1975 (5)
Hansen, 1910 (6)
Hansen, 1912
Illig, 1930
Mauchline, 1980 (7)
Mauchline and Fisher, 1969 (8)
Ponomareva, 1963
G.O. Sars, 1885 (9)

Nematoscelis mantis
Chun, 1896

CHARACTERIZATION (1, 3, 4, 9)

Rostrum. Short, narrowly triangular and pointed.

Carapace. Short, low keel and no denticles on the lateral margin.

Eyes. Upper lobe wider and much larger than lower. Constriction a light transverse band between the dark brown-black lobes.

Antennae. Spine on distal outer margin of scale very small.

Thoracopods. Propodus of 1st has setae arranged in 1-2 rows, and dactyl bears 1 long dorsal seta. Elongated 2nd has spines only on its ultimate segment.

Abdomen. No dorsal spines or keels. Distinctly slender and elongate.

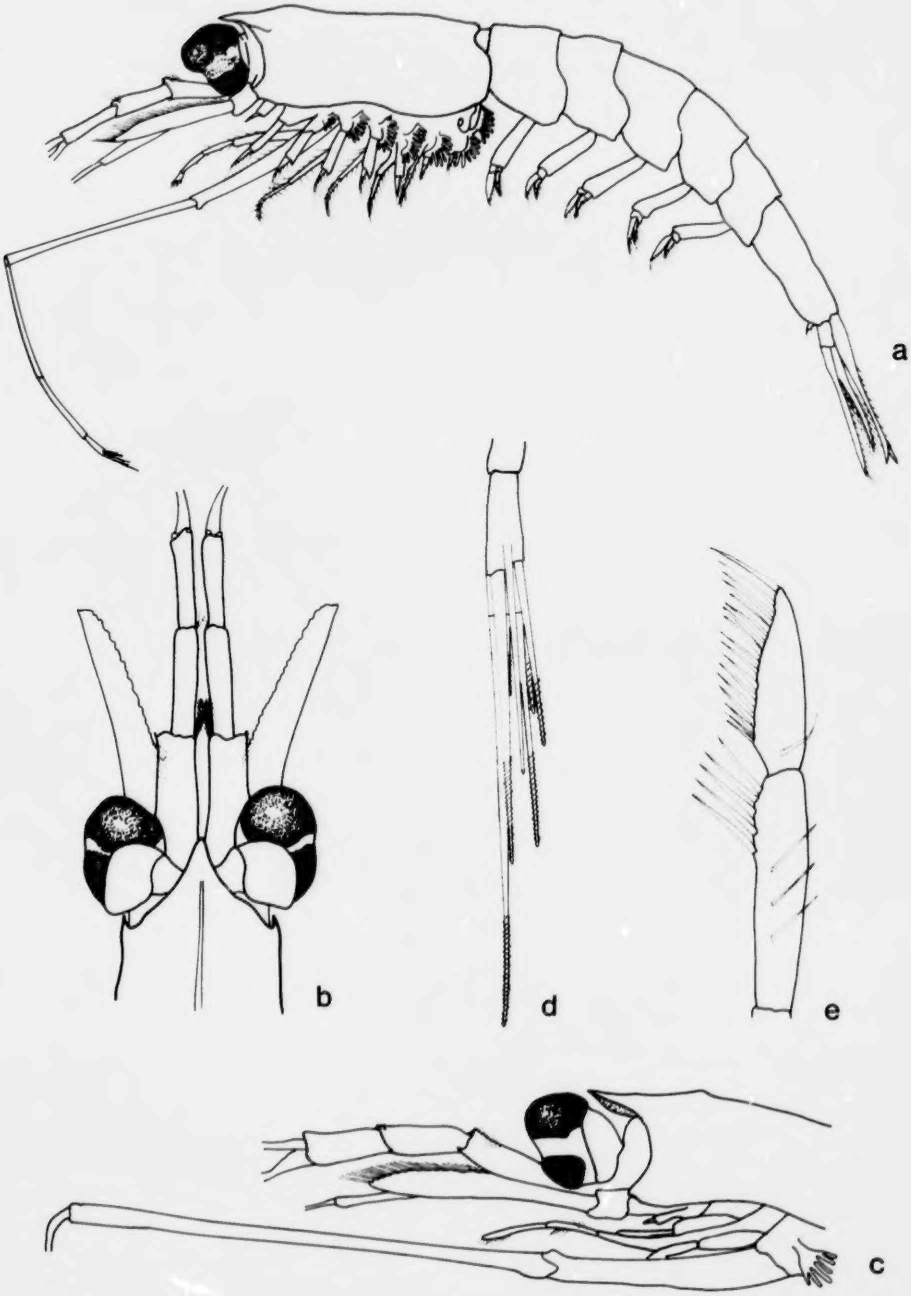
Petasma. Both spiniform and terminal processes very small, with spiniform slightly longer than terminal. Proximal process long and straight, tapering to a rounded end bearing strong saw teeth on outer margin. Lateral process about same size and shape as proximal, but teeth on distal margin rounded.

TAXONOMIC NOTES Denticle on lateral margin of carapace lacking in Pacific specimens of males, but present in males from Atlantic. It is absent in females from either location (1). Type species of Sars in the British Museum is a young specimen, only 9 mm (6). This may account for (9) stating that the antennal scale does not reach beyond the 2nd segment of antennular peduncle, while (1), (3) and (6) do not mention this but illustrate it as extending well beyond the 2nd segment. The relatively very large upper lobe of the eye is characteristic of *N. tenella* within the genus (1).

ECOLOGICAL NOTES An omnivore, consuming diatoms, dinoflagellates, radiolarians and crustaceans. Consumed by planktivorous and micronektonic fish (7).

DISTRIBUTION This mesopelagic species is widely distributed in the Pacific, Atlantic and Indian Oceans. In the Pacific it occurs south of 40°N except in the cooler part of the California Current. It has only been recorded off the California coast, but could be expected slightly northward during intrusions of warmer water. Adults are generally found below 200 m and above 800 m, and larvae above 100 m (1, 2, 8).

Figure. a. lateral view, female (1); d. dorsal view, anterior end, female (6); c. lateral view, anterior end, male (6); d. distal end, 2nd thoracopod (6); e. distal end, 1st thoracopod (5).



Nematoscelis tenella

Nyctiphanes simplex Hansen, 1911

SYNONYMY AND REFERENCES

Nyctiphanes simplex Hansen, 1911 (1)

Boden, 1951 (2)	Brinton & Wyllie, 1976 (5)	Mauchline, 1980 (8)
Boden et al., 1955 (3)	Esterly, 1914 (6)	Mauchline & Fisher, 1969 (9)
Brinton, 1962 (4)	Hansen, 1912 (7)	

CHARACTERIZATION (3, 6, 7)

Rostrum. Moderately long, triangular frontal plate with raised margins, lacking true rostrum.

Carpace. Cervical groove and median keel distinct but no denticles.

Eyes. Moderately large, spherical, black.

Antennules. Outer distal margin of 1st segment with conspicuous spine, directed forward and outward, with thick base tapering to acute point. Dorsal distal surface has very large lappet, directed upward and backward, about twice as long as broad at base with hollow anterior surface. In females upper end of the lappet is rounded with a small inner point; in males it is broadly truncate and reflexed, with a sharp outer tooth; in juveniles it tapers to an acute tip. 2nd segment in females is long and slender with a small tooth on dorsal, distal, inner angle; in males it is shorter and thicker with a broader and more vertical tooth which may be bifid. 3rd segment in both sexes is shorter than 2nd with inconspicuous keel; in females this keel has small tooth; no tooth in males but segment is strongly curved inward; outer margin is convex, and inner margin is concave with a group of stout setae near middle.

Antennae. Scale does not reach to end of 2nd segment of antennular peduncle.

Abdomen. Dorsal tooth at end of 6th segment.

Petasma. Inner lobe is serrate along two-thirds of its outer margin, bearing long, bent, spiniform process. Proximal and terminal processes lacking. Median lobe very short and poorly developed, bearing long lateral process which bends sharply outward at acute end.

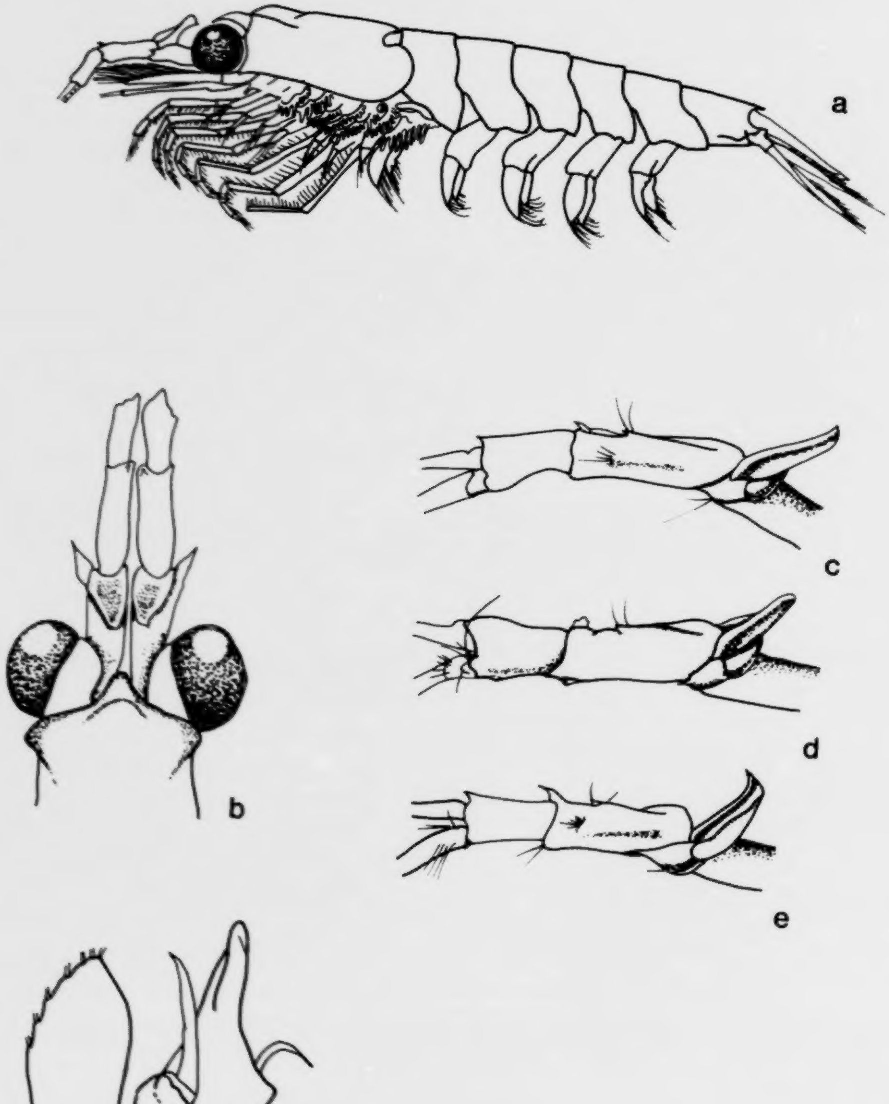
Size. Egg-bearing females are 14-15 mm; adult males are 11-12 mm (6); (1, 3) give the length as 11-16 mm.

TAXONOMIC NOTES. This species is allied to N. simplex, but can be distinguished by the antennular peduncle of both sexes and by the petasma (7). Esterly (6) incorrectly stated that there was no median lobe on the petasma; it is present but reduced and indistinct.

ECOLOGICAL NOTES. Considered a coastal species; performs daily vertical migration; aggregates. Consumed by fish and whales (8).

DISTRIBUTION. Associated with coastal waters in transition zones between warm and cold currents, often conspicuous in areas of upwelling (4). Generally found at 50-300 m during the day and 0-100 m at night (8). Usually found in warmer waters in the Gulf of California and in the Peru Current, but has been recorded north to 40° and south to 35°50'. In 1983 and 1984, it was collected as far north as the Stait of Juan de Fuca off British Columbia due to the intrusion of warmer water from the El Niño event, but has not since been found (R. Brodeur, personal communication).

Figure. a. lateral view, male (3); b. dorsal view, anterior end, female (6); c. lateral view, antennule, female (7); d. lateral view, antennule, male (7); e. lateral view, antennule, juvenile (7); f. petasma (3).



Nyctiphanes simplex

Genus Stylocheiron G.O. Sars, 1883

SYNONYMY AND REFERENCES

Stylocheiron G.O. Sars, 1883

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Hansen, 1911
Hansen, 1912 (5)
Mauchline and Fisher, 1969 (6)
Ortmann, 1893 (7)
G.O. Sars, 1885 (8)
Zimmer, 1909

CHARACTERIZATION (1, 2, 4, 5, 8)

Rostrum. Variable.

Carapace. No denticles on lateral margin.

Eyes. Elongate and bilobate; the upper lobe narrower than or equal to the lower.

Antennules. 2nd and 3rd segments of peduncle long and slender in females, shorter and thicker in males. Upper flagellum is shorter than the lower; the segments are slender and cylindrical in females, and flattened and expanded in males.

Antennae. Peduncle reaches beyond the end of the scale.

Thoracopods. 1st and 2nd short and slender. 3rd extremely elongate and bears a short ischium, merus and carpus. The strong spiniform bristles of the propodus and the spines or spine-like processes of the dactyl form a chela-like structure. The remaining decrease in size posteriorly. Endopod of the 6th has 3 segments in females and 3 or less in males; the 7th has 2 segments in females and is lacking in males. Endopod of the 8th is rudimentary in both sexes.

Petasma. Inner and median lobes coalesced, bearing the usual 3 processes, which are small and slightly curved. Median lobe oblong and distally rounded, with the lateral process inserted near the base of the inner margin. There is never an additional process. The much reduced auxiliary lobe is on the inner side of the setiferous lobe.

TAXONOMIC NOTES Nine of the ten species fall into two groups: "Stylocheiron longicorne group", characterized by pseudochelae on the 3rd thoracic endopod, and "Stylocheiron maximum group", characterized by true chelae on the 3rd thoracic endopod (4). Keys to species are found in (2), (4), (7) and (8).

There are 10 known species; 3 occur in the Northeast Pacific.

DISTRIBUTION Essentially a warm water epipelagic genus (the 2 local species are exceptions), it is widely distributed in the Pacific, Atlantic and Indian Oceans (3, 5).

Stylocheiron longicorne G.O. Sars, 1883

SYNONYMY AND REFERENCES

Stylocheiron longicorne G.O. Sars, 1883

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Costanzo & Guglielmo, 1976 (5)
Fulton & LeBrasseur, 1984 (6)
Hansen, 1910 (7)
Hansen, 1912 (8)
Mauchline, 1980 (9)
Mauchline & Fisher, 1969 (10)
Ortmann, 1893
Ponomareva, 1963
G.O. Sars, 1885 (11)
Zimmer, 1909

Stylocheiron mastigophorum (in part) Chun, 1896

Stylocheiron suhmii (in part) Ortmann, 1905

CHARACTERIZATION (1, 2, 4, 11)

Rostrum. Variable; short and broadly triangular to medium long and narrow.

Carapace. Short low keel.

Eyes. Twice as high as broad, with upper portion as broad as or broader than the lower, and with numerous enlarged crystalline cones.

Antennules. 1st segment of peduncle equal to (males) or longer than (females) the carapace.

Thoracopods. Elongated 3rd bears a false chela, formed by bristles on the propodus and dactyl.

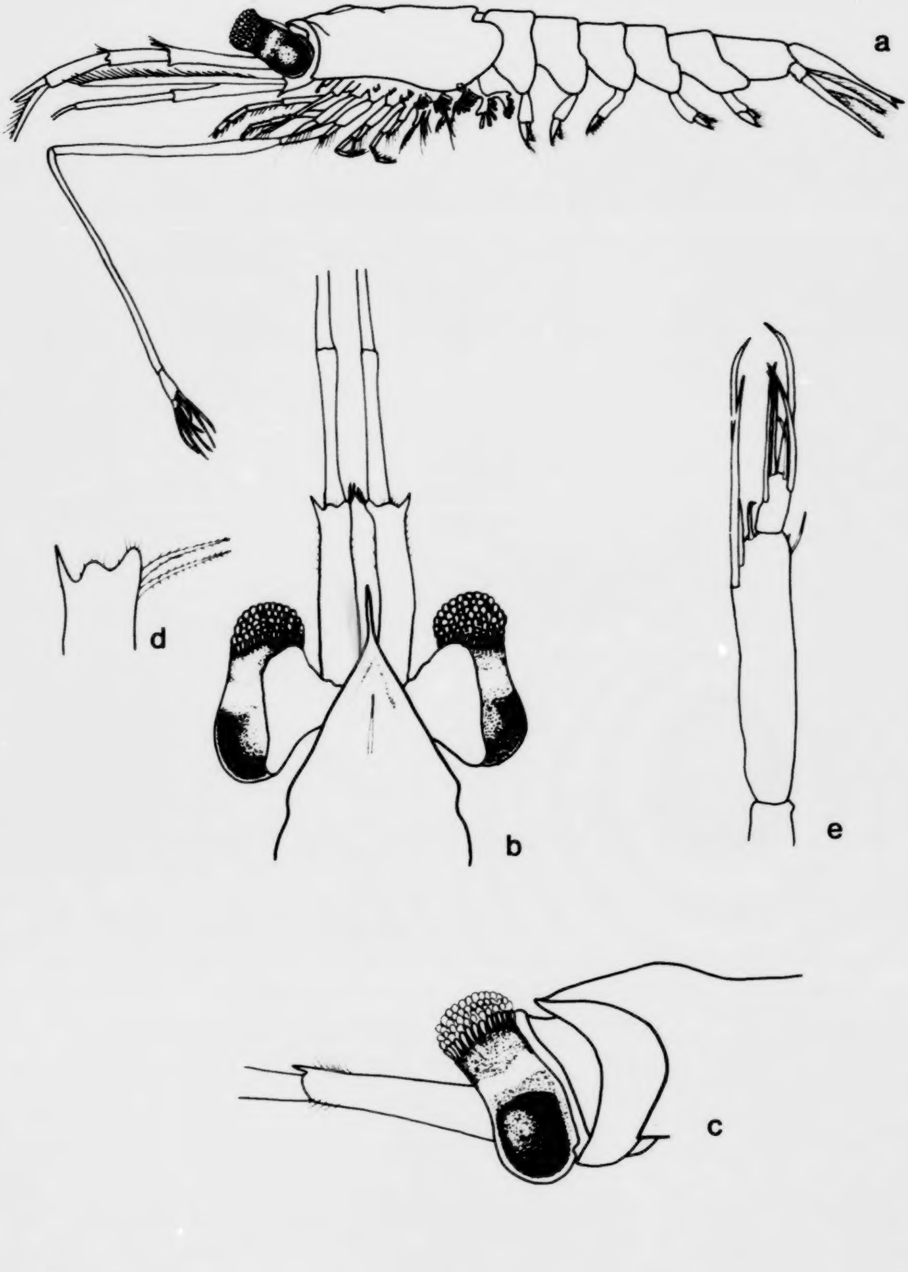
Petasma. Spiniform process present. Terminal and proximal processes about equal in length, bending toward spiniform process. Terminal process serrated or crenulated distally. Sinuate lateral process shorter and thinner than terminal.

TAXONOMIC NOTES Brinton (3) has noted 2 forms from the Pacific: a "Short Form" - 6th abdominal segment is almost twice as long as 5th and upper part of eye is rarely wider than lower; and a "Long Form" - 6th abdominal segment is more than twice as long as its depth, and upper part of eye is usually wider than lower. Sars' type specimen was the former. Illustrations (e.g., 2, 3, 4, 7, 11) show the rostrum quite variable, although only discussed by (1), who found 3 different rostral types, and by (7), who described the frontal plate as having no rostrum to having a very long one. Our specimens indicate that males are short while females are medium long, but more specimens need to be examined. Diagnostic value of female thelycum is discussed by (5).

ECOLOGICAL NOTES Mainly a predator; crustaceans and algae found in stomachs. Consumed by planktivorous and micronektonic fish (9).

DISTRIBUTION This mesopelagic species occurs in the Pacific, Atlantic and Indian Oceans. Wider upper eye of "Long Form" seems to be associated with the warm water part of the range of both forms (3). In NE Pacific reported as far north as British Columbia (1, 6). Probably occurs from 100 to 500 m deep, and does not migrate or migrates short distances (9, 10).

Figure. a. lateral view, male (2); b. dorsal view, anterior end, female (original); c. lateral view, anterior end, male (7); d. distal end, 1st segment of anten-



Stylocheiron longicorne

Stylocheiron maximum Hansen, 1980

SYNONYMY AND REFERENCES

Stylocheiron maximum Hansen, 1908

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Costanzo & Guglielmo, 1976 (5)
Fulton & LeBrasseur, 1984 (6)
Hansen, 1910 (7)
Hansen, 1912
Mauchline, 1980 (8)
Mauchline & Fisher, 1969 (9)
Ponomareva, 1963
Zimmer, 1909

CHARACTERIZATION (1, 2, 4, 7)

Rostrum. Long, broadly triangular; V-shaped in cross section.

Carapace. Small keel present; cervical groove present.

Eyes. Upper part slightly narrower than lower. No enlarged crystalline cones, but facets of upper lobe slightly larger than those of lower.

Antennae. Scale acuminate, with outer concave margin ending in a strong spine. Flagella almost half as long as the body.

Thoracopods. Well-developed spine on the propodus and curved dactyl form true chela on elongated 3rd.

Abdomen. No dorsal spines or keels. 6th segment about 1.5X as long as 5th.

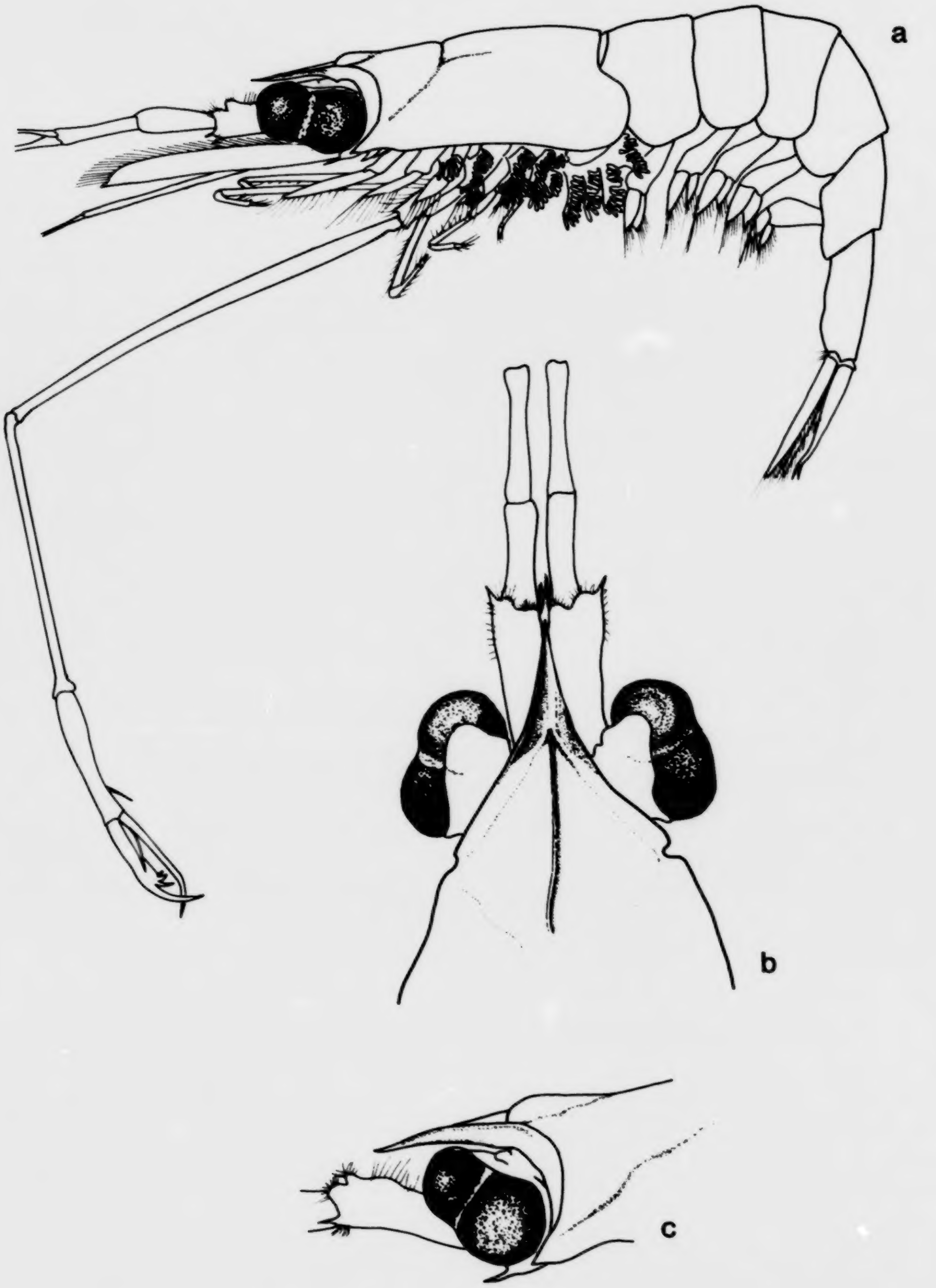
Petasma. Spiniform process slender and bent strongly inward below midpoint. Terminal and proximal processes slightly curved, about equal in length and quite variable. Lateral process about half as long as proximal process.

TAXONOMIC NOTES Petasma is quite variable among specimens. Banner (1) examined 15 petasmae from the NE Pacific and found that no 2 specimens were similar; and (4) found variability among the SE Asian specimens. Post larval and immature specimens resemble *S. abbreviatum*, but the larger body size of *S. maximum* at analagous stages of development and the lobe-like (vs. pyriform) upper part of the eye are characteristic. 6th abdominal segment of adult *S. maximum* longer than in *S. abbreviatum*, but in young specimens (_10 mm) the opposite is true (4). Description of female thelycum given by (5).

ECOLOGICAL NOTES This is the largest species in the genus (4). It is preyed upon by demersal and micronektonic fish, and is generally considered a predator, consuming crustaceans, detritus and diatoms (8).

DISTRIBUTION This mesopelagic species occurs in the Pacific, Atlantic and Indian Oceans (9). In the Pacific it is present from the Aleutian Islands south to 50°S, with records from 63°S. It appears absent between 10° and 20°N west of Central America (3). It has been reported from Alaska, British Columbia and Washington (1, 6). The adults occur below 500 m (9).

Figure. a. lateral view, female (2); b. dorsal view, anterior end, female (original); c. lateral view, anterior end, male (7).



Stylocheiron maximum

Genus Tessarabrachion Hansen, 1911

SYNONYMY AND REFERENCES

Tessarabrachion Hansen, 1911 (1)

Banner, 1950 (2)	Hansen, 1915 (5)
Boden et al., 1955 (3)	Mauchline & Fisher, 1969 (6)
Fulton & LeBrasseur, 1984 (4)	Nemoto, 1966 (7)

CHARACTERIZATION (1, 2, 3, 5, 7)

Rostrum. Frontal plate small and broadly rounded, with a short, broad triangular anterior part. True rostrum lacking.

Eyes. Large, higher than broad, distinct constriction with upper part smaller than lower part.

Antennules. 1st segment of the peduncle lacks distal lobes and is much broader than the 2nd and 3rd. 2nd and 3rd segments broader in male than female. Upper flagellum shorter than the compressed lower one in the male. Flagella flattened, broader in the male than in the female.

Thoracopods. 2nd and 3rd extremely elongate and similar. 4th, 5th and 6th normal. Exopod of the 6th pair normally developed, but endopod slender and 2-segmented in the female and lacking in the male. Endopod of the 8th lacking in both sexes, and exopod small, 1-segmented and styliform.

Petasma. Inner and middle lobes combined to form a simple rounded plate, with 2-3 fine marginal bristles but no processes. Setiferous and auxiliary lobes well developed, the latter has small hooks.

TAXONOMIC NOTES Structure of the elongate thoracopods and the abdomen similar to that of Thysanoessa, but can be differentiated by the lack of a rostrum and two pairs of elongate thoracopods (5).

The genus contains one species, T. oculatum.

ECOLOGICAL NOTES All bioluminescent organs are present (5).

DISTRIBUTION Confined to the North Pacific between 53°N and about 35°N, from the Sea of Japan east to western North America. Only present in the Bering Sea along the Aleutian Islands. Mesopelagic species caught at depths between surface and 1000 m (4, 6).

Tessarabrachion oculatum Hansen, 1911

SYNONYMY AND REFERENCES

Tessarabrachion oculatum

Banner, 1950 (1)	Mauchline, 1980 (4)
Fulton & LeBrasseur, 1984 (2)	Mauchline & Fisher, 1969
Hansen, 1915 (3)	

Tessarabrachion oculata Hansen, 1911 (5)

Tessarabrachion oculatus

Boden et al., 1955 (6)	Komaki, 1960 (8)
Brinton, 1962 (7)	Ponomareva, 1963

CHARACTERIZATION (1, 3, 5, 6, 8)

Carapace. Shallow cervical groove, no denticles on the lateral margin and a low keel. Upturned forward margin of frontal plate is a good obvious character.

Antennules. Distal inner margin of the 1st peduncular segment has 2 long barbed spines.

Antennae. Scale reaches to the middle of the 3rd antennular peduncle.

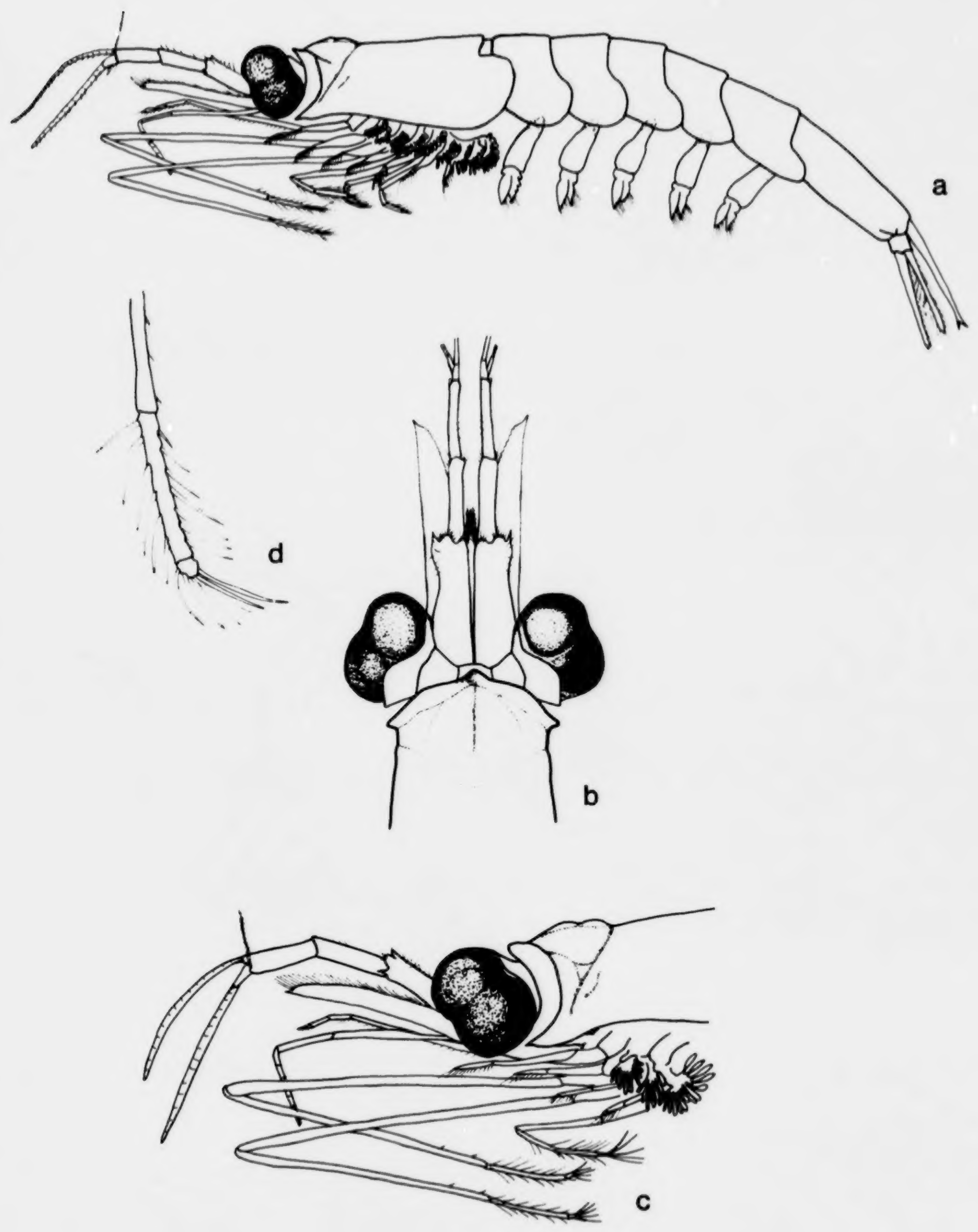
Abdomen. 6th segment long, about equal to the combined length of the 4th and 5th segments. No dorsal spines or keels.

TAXONOMIC NOTES There is some confusion about the correct spelling of the specific epithet. Although "oculatum" is the correct corresponding latinization for Tessarabrachion, according to the International Code of Zoological Nomenclature "the valid name of a taxon is the oldest available name applied." Thus "oculata", named by Hansen in 1911, should take precedence over "oculatum", apparently corrected by Hansen in 1915. We have retained "oculatum", since it appears to be the preferred common usage today. Reasons why (6) changed it to "oculatus" are not clear (Brinton, pers. comm.).

ECOLOGICAL NOTES An important prey item for planktivorous fish (4).

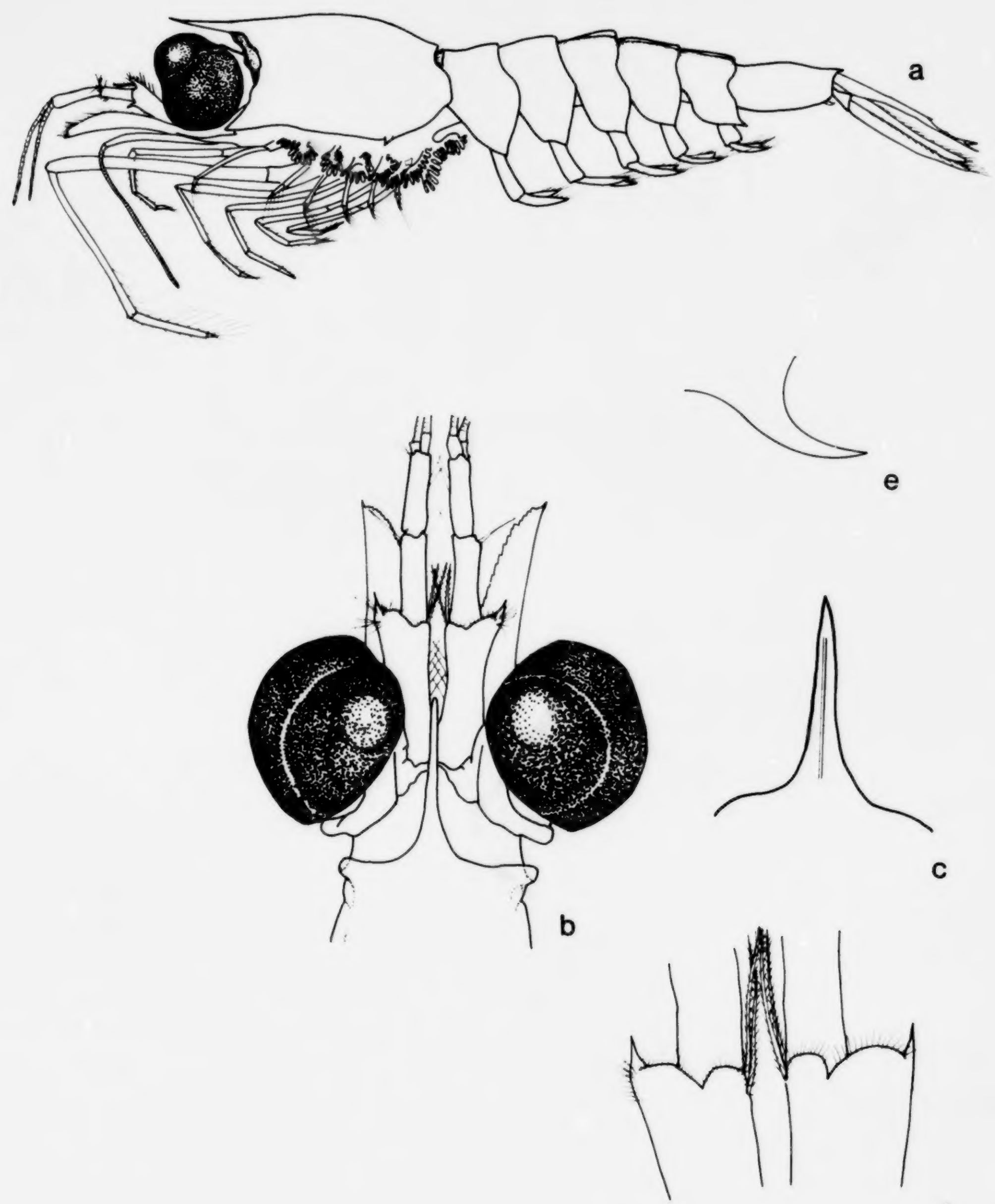
DISTRIBUTION Same as generic distribution.

Figure. a. lateral view, male (6); b. dorsal view, anterior end, female (3); c. lateral view, anterior end, male (3); d. distal end, 2nd thoracopod (3).



Tessarabrachion oculatum

Figure. a. lateral view, female (1); b. dorsal view, anterior end, male (8); c. rostrum, female (original); d. antennular peduncle, 1st segment (original); e. preanal spine (original).



Thysanoessa inspinata

Genus Thysanoessa Brandt, 1851

SYNONYMY AND REFERENCES

Thysanoessa Banner, 1950 (1)
Boden et al., 1955 (2)
Casanova, 1984 (3)
Nemoto, 1966 (4)
G.O. Sars, 1885 (5)
Zimmer, 1904

CHARACTERIZATION (1, 2, 5)

Rostrum. Well developed.

Eyes. With or without transverse constriction; usually higher than broad; sometimes sub-circular.

Antennae. Distal segments of antennular peduncle narrower in female than in male. Flagella are short in both sexes.

Mandibles. Mandibular palp small.

Thoracopods. First six normally developed. 2nd pair may be elongated, with stiff setae along the margins of the two terminal endopod segments. In females, the endopod of 7th composed of one or two segments, at most slightly longer than exopod; endopod absent in males. Endopod of 8th absent in both sexes; exopod of 8th represented by a styliform process.

Petasma. Spiniform process of inner lobe thin and curved; proximal, terminal and lateral processes well developed; additional process usually absent or poorly developed if present.

TAXONOMIC NOTES Believed closely related to Nematoscelis by (2), differing in structure of 2nd pair of thoracopods, petasma and mode of egg bearing: eggs of Thysanoessa shed freely in the sea while those of Nematoscelis retained attached to the body. However, in her discussion of euphausiid phylogeny (3) considers Thysanoessa not to be close to Nematoscelis.

Nemoto (4) presents an in-depth study of all the Thysanoessa species, including morphological variations, allomorphosis and ecology.

Ten species are known (4); six are found in this area.

ECOLOGICAL NOTES Bilobate eye of Thysanoessa species may be related to broad depth range. Reduction in posterior thoracic legs considered a step towards carnivorous feeding (4).

DISTRIBUTION Cosmopolitan (none tropical), occurring in all oceans but particularly in mid to high latitudes. Found at depths from 0 to 1000 m.

Thysanoessa gregaria G.O. Sars, 1883

SYNONYMY AND REFERENCES

Thysanoessa gregaria G.O. Sars, 1883

Boden et al., 1955 (1)
Brinton and Wyllie, 1976
Hansen, 1905a, b
Hansen, 1911
Hansen, 1913a
Mauchline, 1980 (2)
Mauchline and Fisher, 1969 (3)
Nemoto, 1966 (4)
Ponomareva, 1963
G.O. Sars, 1885 (5)
Zimmer and Grunner, 1956

CHARACTERIZATION (1, 4, 5)

Rostrum. Produced, reaching beyond the middle of basal segment of antennular peduncle. Female has a somewhat broadened lanceolate rostrum with a pointed tip. In the male it is constricted at the base, narrower, and with a broadly rounded tip.

Carapace. Lateral denticle behind middle of inferior margin.

Eyes. Very large; upper lobe about half the width of the lower lobe.

Thoracopods. Distal end of merus of 2nd reaches to end of the antennular peduncle. Setae on the lower margins of the propodus of the 2nd and 4th strong, plumose, and as long or longer than the terminal setae on the dactyl.

Abdomen. Preanal spine broad and compressed laterally, usually with several denticles on the posterior margin. No dorsal spines or keels.

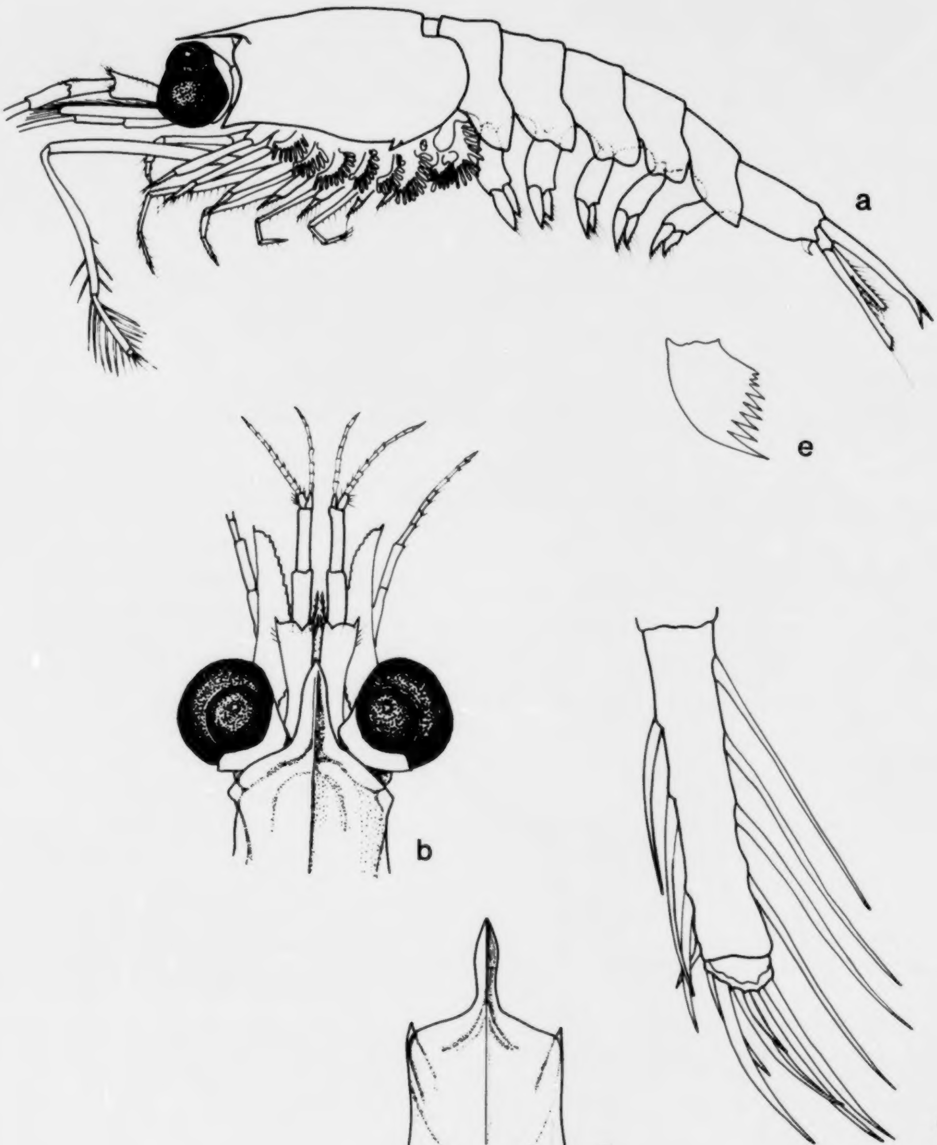
Petasma. Spiniform process small, slender and slightly curved. Terminal process has a broad base, curves slightly at the first third of its length, then maintains the same breadth until it expands somewhat at the broad, truncate, serrate edge. Proximal process longer and more slender than the terminal, and somewhat curved. Distally, it ends as a triangular, winglike expansion, which is serrate along the distal margin. Beyond this extension is a short, slender, somewhat curved, subacute process with teeth along the outer margin. Lateral process long and slightly curved. Its level of insertion considerably distal to that of the proximal process. Median lobe narrow and truncate. Auxiliary lobe shorter than that of T. longipes.

TAXONOMIC NOTES Preanal spines can be quite variable, exhibiting sexual and individual dimorphism. They range from a single apical and inner accessory tooth to a very denticulate form with many inner teeth. Lateral denticle on the carapace is often incomplete and may be lacking. It is easily distinguished from T. inspinata and T. longipes by the absence of abdominal keels or spines dorsally.

ECOLOGICAL NOTES Considered an offshore filter-feeding species developing to a more carnivorous feeder, which is perhaps reflected in the short tough spines on the dactyl of the elongated 2nd thoracopod (4). Consumes detritus and dinoflagellates, and is eaten by fin, humpback, sei and Bryde's whales, and planktivorous fish and birds (2, 3).

DISTRIBUTION This epipelagic species is found in the North and South Pacific, Middle and South Atlantic, and Indian Oceans. Reported locally from northern California to Oregon (1, 3). It commonly occurs above 200 m, but is found as deep as 1000 m (1, 4).

Figure. a. lateral view, female (1); b. dorsal view, anterior end, female (5); c. frontal plate and rostrum, male (5); d. 2nd thoracopod (1); e. preanal spine (1).



Thysanoessa gregaria

Thysanoessa inermis (Kroyer, 1846)

SYNONYMY AND REFERENCES

Thysanoessa inermis (Kroyer, 1846)
Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Einarsson, 1945 (4)
Fukuchi, 1977 (5)
Hansen, 1911
Hansen, 1915
Mauchline, 1980 (6)
Mauchline & Fisher, 1969 (7)
Nemoto, 1966 (8)
Nemoto et al., 1973 (9)
Schmitt, 1919
Tattersall, 1933

Boreophausia inermis G.O. Sars, 1886
Hansen, 1887

Euphausia inermis G.O. Sars, 1883

Rhoda inermis Sim, 1872
Stebbing, 1893
Zimmer, 1904

Thysanoessa arberdonensis Sim, 1872

Thysanoessa borealis G.O. Sars, 1883

Thysanopoda inermis Kröyer, 1846
Kroyer, 1859

Thysanopoda neglecta Kröyer, 1846
Hansen, 1887

CHARACTERIZATION (1, 2, 4, 8)

Rostrum. Narrow, reaching beyond the eyes; sweeps somewhat downward so that the tip is lower than the frontal plate.

Carapace. Lateral margins with no denticles.

Eyes. Almost circular, sometimes slightly higher than broad.

Antennules. 1st segment of the peduncle of males has a rounded, upward-projecting lobe bearing 2 rows of slightly recurved spines. Females bear a small lobe with setae. 2nd segment in males has its outer anterior margin produced dorsally as a fingerlike process; the inner margin produced as an upward-pointing lobe with an upper margin armed with hook-shaped spines. No lobes or spines in females.

Thoracopods. 2nd similar to others in size and shape (see Taxonomic Notes). 7th and 8th reduced in male; 8th reduced in female.

Abdomen. 6th segment shorter than the sum of the 4th and 5th, and bears a slender, acute spine at its mid-dorsal posterior margin. 5th may or may not bear dorsal spine (see Taxonomic Notes). No dorsal keels.

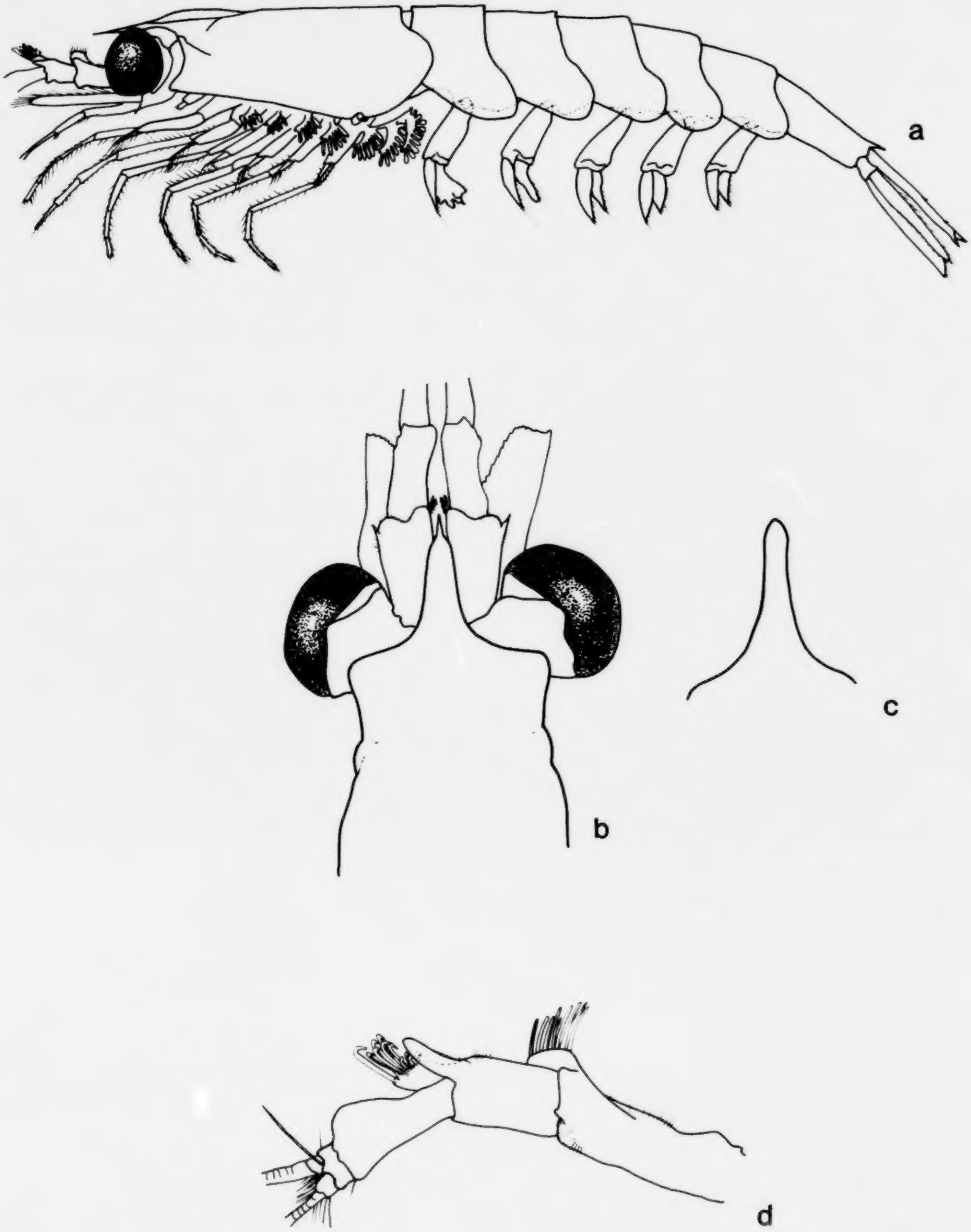
Petasma. Bears a slender, curved spiniform process. Inner side of the terminal process has 2 long thick membranous expansions with a canal running between. Proximal and lateral processes straight and cylindrical with acute ends. Median lobe has a pronounced shoulder on its outer edge.

TAXONOMIC NOTES Several authors (1, 2, 4) have indicated that the 2nd thoracopod can be either thickened and elongated or similar in size and shape to the others. Nemoto (8), however, considers the 2nd as similar to the others and does not discuss possible varieties or forms. Juveniles may exhibit a slightly constricted eye pattern. Dorsal spines can occur on either abdominal segment 5 and/or 6, and do not appear to follow any specific pattern. However, (8) found a higher incidence of the two-spined form along the Aleutian Islands than he did in the waters off Kamchatka, and (9) found an average of 84% of the one-spined form and 16% of the two-spined form in the Sea of Japan, but 25% of the one-spined form and 75% of the two-spined form in the Gulf of Alaska, indicating a cline in the abundance of these forms across the North Pacific.

ECOLOGICAL NOTES Important prey items for blue, fin, sei and humpback whales, as well as seals, fish and birds (6, 7). Banner (1) states that T. inermis was the only euphausiid found in the stomachs of 90% of 23 whales landed at Akutan, Alaska. Consume detritus, algae, diatoms, dinoflagellates, tintinnids, radiolarians, medusae, chaetognaths, molluscs, echinoderms and crustaceans (6, 7).

DISTRIBUTION Most individuals occur between 140-280 m during daylight and above 140 m at night but are found to 400 m depth. They are reported from the North Atlantic, North Pacific, Arctic and Beaufort Sea. In the Pacific this species occurs south to approximately 43°N (3, 7). Fukuchi (5) found this species restricted to 32.1-33.4 °/oo salinity in the northern North Pacific.

Figure. a. lateral view, male (2); b. dorsal view, anterior end, female (original); c. antennular peduncle, male (4).



Thysanoessa inermis

Thysanoessa inspinata Nemoto, 1963

SYNONYMY AND REFERENCES

Thysanoessa inspinata Nemoto, 1963 (1)
Fulton & LeBrasseur, 1984 (2)
Mauchline, 1980 (3)
Mauchline & Fisher, 1969 (4)
Nemoto, 1966 (5)

Thysanoessa longipes "spineless form"
Banner, 1950 (6)
Boden et al., 1955 (7)
Brinton, 1962
Komaki, 1960 (8)
Nemoto, 1957
Ponomareva, 1957

CHARACTERIZATION (1, 5)

Rostrum. Female has a straighter rostrum while male shape is more lanceolate; both have pointed apices.

Carapace. Denticle present in the posterior third of the lower lateral margin.

Eyes. Size of the upper lobe in the large constricted eye is much smaller than the lower lobe.

Thoracopods. Very elongate 2nd.

Abdomen. 6th segment has a small spine dorsally, but may be absent in some cases. 3rd to 5th segments keeled.

Petasma. Terminal process as long and broad as the proximal process. Space between the terminal and proximal processes very narrow; slope from the terminal process to the proximal process gentle. Both these processes taper to a blunt top, often bearing small protrusions. Spine shaped process curved and small. Lateral process sometimes curved in the middle or straight.

TAXONOMIC NOTES Examination of specimens of the "spineless form" of *T. longipes* by (1) led to the separation into 2 species - a truly "spineless form" of *T. longipes* and the new species *T. inspinata*, which can be distinguished from *T. longipes* as follows.

	spineless *T. longipes*	*T. inspinata*
lateral denticle on carapace	just posterior to middle	posterior 1/3
spines on abdominal segments	none	6
Petasma		
terminal process	base longer + narrower	base shorter + broader
proximal process	base longer + narrower	base shorter + broader
terminal process length	shorter than proximal	equal to proximal
slope between terminal and and proximal processes	sharp	gentle
Eyes	smaller than *T. inspinata*	larger than *T. longipes*
2nd thoracopods	longer than *T. inspinata*	shorter than *T. longipes*

T. inspinata appears to be more common than the "spineless form" of *T. longipes*. The keel of the 3rd abdominal segment on the "spineless form" is slightly protruded posteriorly, with the 4th-6th segments lacking true spines. The most reliable characters for separation of *T. inspinata* from either the spined or spineless forms of *T. longipes* are noted above (1). For a complete discussion of these species, see (1).

ECOLOGICAL NOTES Important food items for blue, fin, sei and humpback whales (4).

DISTRIBUTION This species is restricted to the North Pacific, occurring south of 50°N in the Gulf of Alaska and extending west to the Sea of Japan. It usually occurs in less than 300 m of water, but has been found at depths of 500 m (4, 5). *T. inspinata* and both the spined and spineless forms of *T. longipes* co-occur in some samples from the Queen Charlotte Islands region (2).

Thysanoessa longipes Brandt, 1851

SYNONYMY AND REFERENCES

Thysanoessa longipes Brandt, 1851

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Fukuchi, 1977 (4)
Fulton & LeBrasseur, 1984 (5)
Hansen, 1911
Komaki, 1960 (6)
Mauchline, 1980 (7)
Mauchline & Fisher, 1969 (8)
Nemoto, 1963 (9)
Nemoto, 1966 (10)
Ponomareva, 1963
Regan, 1968 (11)
Schmitt, 1919
Vermeer, 1981 (12)
Vermeer, 1985 (13)
Vermeer et al., 1985 (14)

Thysanoessa armata
Marukawa, 1928

Thysanoessa gregaria
Hansen, 1915

CHARACTERIZATION (2, 6, 9, 10)

Rostrum. Narrow with low keel; reaches to anterior margin of the eyes. Each side of the base of the rostrum protrudes as a curved, supraorbital flange, as with T. spinifera.

Carapace. Denticle located slightly behind the middle on the lateral margin.

Eyes. Large; upper section considerably narrower than the lower.

Antennules. Two distal segments of the peduncle are long and slender in the female; 3rd conspicuously more slender than the 2nd. Segments are heavier in the male and the 3rd segment is only slightly thinner than the 2nd. 1st segment thick and bears a spine on the outer distal margin and 2 barbed spines on the inner distal margin. Flagella are short.

Thoracopods. Distal end of the merus of the 2nd reaches beyond the end of the antennular peduncle. Ischium and merus very strong and heavy. Carpus curved and carries several setae distally.

Abdomen. Posterolateral margins of the abdominal segments acute. Dorsal spines on segments 3-6 (except on "spineless form") and dorsal keels on segments 3-5.

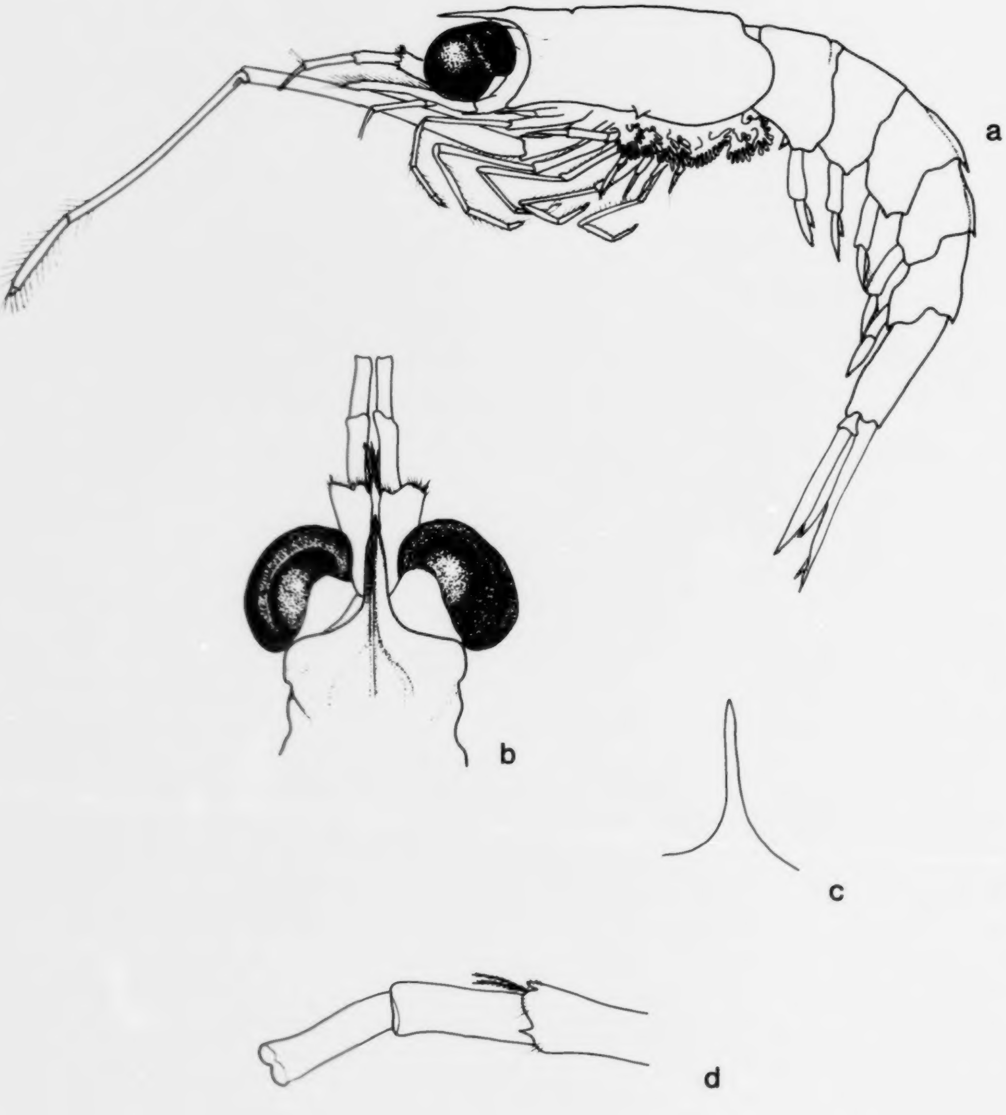
Petasma. Spiniform process curved strongly. Terminal process slender and as long as the proximal process, but the former is thicker than the latter at the base. Both processes are somewhat curved, taper and end in a blunt tip. Lateral process rather straight and more slender than the other processes. Median lobe appears to have a fold at the distal end.

TAXONOMIC NOTES Many of the "spineless forms" of T. longipes are T. inspinata, although there are occasional specimens found of a truly spineless form of T. longipes. For separation of the "spineless form" from T. inspinata, see Taxonomic Notes for T. inspinata. The spineless form "agreed perfectly with the spined form on all characters of primary taxonomic importance" (1), but the spined form appears much larger (22-30 mm) than the spineless form (12-17 mm) and appears to be restricted to more northern latitudes (2, 3).

ECOLOGICAL NOTES An important food item for birds (12, 13, 14) and blue, fin, sei and humpback whales (7, 8). It consumes detritus, diatoms, dinoflagellates, tintinnids, chaetognaths, echinoderms and crustaceans (7). Growth rates for the B.C. coast have been estimated by (5).

DISTRIBUTION This species is found only in the North Pacific, including the Sea of Japan, Othotsk and Bering Seas, and Gulf of Alaska (3, 8). Specimens are recorded from California to Alaska (1, 5). It usually occurs from 0 to 500 m. Fukuchi (4) found this species in 32.6-34.1 o/oo salinity in the northern North Pacific; (11) found it in salinities of 24.5-27.2 o/oo in a B.C. coastal inlet.

Figure. a. lateral view, female, spined form (6); b. dorsal view, anterior end, female (original); c. rostrum, male (original); d. antennular peduncle (original).



Thysanoessa longipes

Thysanoessa raschii (M. Sars, 1864)

SYNONYMY AND REFERENCES

Thysanoessa raschii
Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962 (3)
Einarsson, 1945 (4)
Esterly, 1914 (5)
Fukuchi, 1977
Fulton & LeBrasseur, 1984 (6)
Mauchline, 1980 (7)
Mauchline & Fisher, 1969 (8)
Nemoto, 1966 (9)
Ponomareva, 1963
Regan, 1968 (10)

Thysanopoda raschii M. Sars, 1864
non *T. raschii* Vanhoffen, 1897

Rhoda jardineana Sim, 1872

Euphausia raschii G.O. Sars, 1883

Boreophausia raschii Norman, 1886

Rhoda raschii Stebbing, 1983
Zimmer, 1904

CHARACTERIZATION (1, 2, 9)

Rostrum. Broad with a rounded tip in males; narrow tapering to a pointed subacute angle in females.

Carapace. Lateral denticle anterior to the middle.

Eyes. Large, ovoid to nearly spherical, with no constriction.

Thoracopods. The 2nd are equal to the others, or slightly elongate.

Abdomen. 6th segment much shorter than the combined length of the 4th and 5th. No dorsal spines or keels.

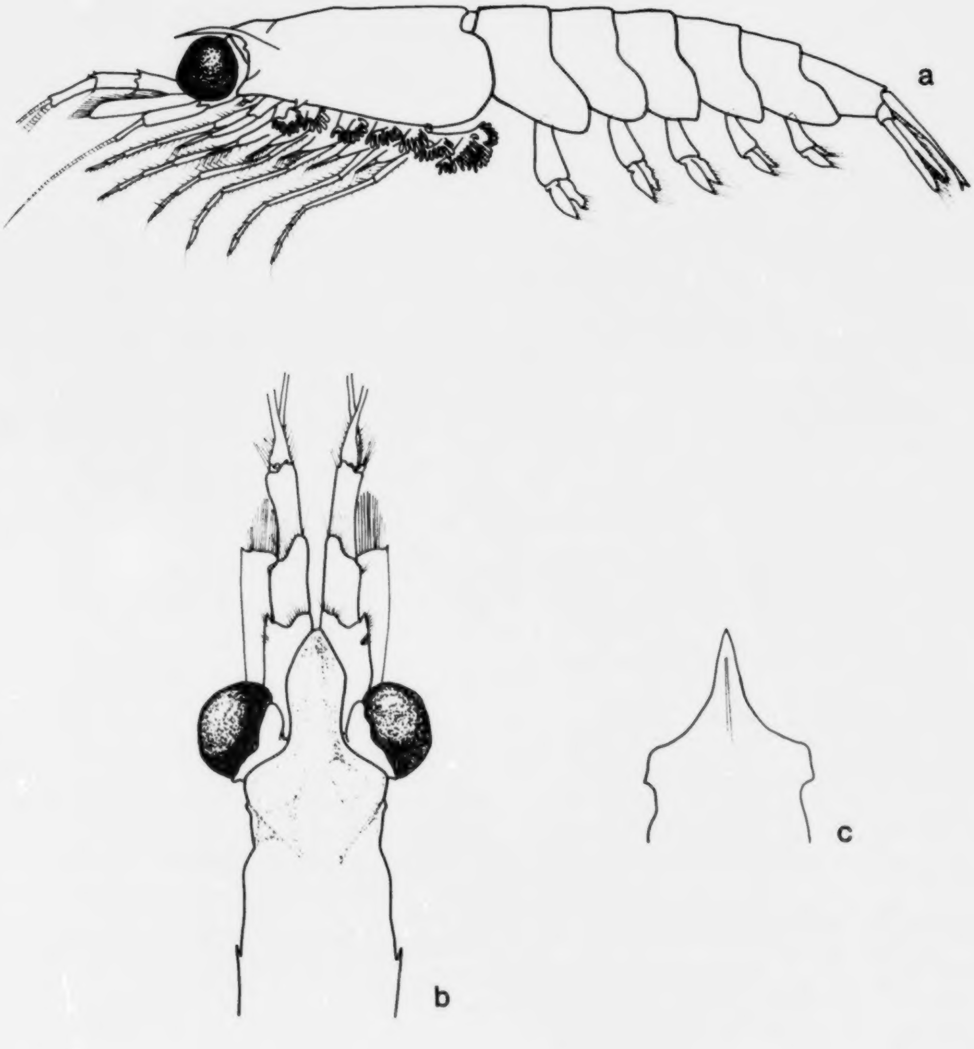
Petasma. Spiniform process well developed and curved. Terminal process has a broad base, with the first quarter almost as broad as the base and ending in a knob-like projection. Remainder curves and tapers to a blunt tip, with a partial groove formed by the rolling together of the process. Proximal process broad proximally, tapering to an acute point. Lateral process as thick and almost as long as the proximal process, attached on the median lobe distal to the attachment level of the proximal and terminal processes and bent sharply at 1/3 and 2/3 its length to form a sharp hook. No additional process.

TAXONOMIC NOTES Esterly (5) reversed the descriptions of the eyes for *T. raschii* and *T. gregaria* in his key (p.10).

ECOLOGICAL NOTES A filter feeder-omnivore, eating detritus, algae, diatoms, dinoflagellates, tintinnids, radiolarians, chaetognaths and crustaceans. Consumed by whales, seals, fish and birds (6).

DISTRIBUTION Usually found along the Continental Shelf or the neritic shore waters in the Arctic regions (9), from 0-200 m depth; one record from 0-1000 m (3). It occurs in the North Atlantic (from Scotland northeast to the Barents Sea, west to the Gulf of Maine and Hudson and Baffin Bays), North Pacific (Sea of Japan and Othotsk Sea east to Bering and Beaufort Seas and Gulf of Alaska) and Arctic (where it and *T. inermis* are the only common species) (3, 7, 8). Recorded from Oregon, British Columbia and Alaska (1, 6). Found in 25.7-26.8 o/oo salinity in a B.C. inlet by (10).

Figure. a. lateral view, male (2); b. dorsal view, anterior end, male (4); c. frontal plate and rostrum, female (original).



Thysanoessa raschi

Thysanoessa spinifera Holmes, 1900

SYNONYMY AND REFERENCES

Thysanoessa spinifera Holmes, 1900

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1962
Brinton & Wyllie, 1962
Fukuchi, 1977 (3)
Fulton & LeBrasseur, 1984 (4)
Hansen, 1911
Hansen, 1915 (5)
Mauchline, 1980 (6)
Mauchline & Fisher, 1969 (7)
Nemoto, 1966 (8)
Ponomareva, 1963
Regan, 1968 (9)
Tattersall, 1933
Vermeer, 1981 (10)
Vermeer, 1985 (11)
Vermeer et al., 1985 (12)

CHARACTERIZATION (1, 2, 8)

Rostrum. Triangular, very acute; narrower and longer than other *Thysanoessa* species. Prominent supraorbital spine carried on either side at the base of the rostrum.

Carapace. No denticles on the lateral margins. Anterolateral angle acute and has a short spine just above it.

Eyes. Large, almost round, slightly narrower dorsally than ventrally, not constricted.

Antennules. 1st segment of the peduncle flattened; outer, anterior margin bears a small spine on its lower side. 2nd segment a little longer than the 3rd; both more slender in the female than in the male. In the male the dorsal, distal margin of the 2nd segment extends into a lobe which carries a bundle of thick, recurved setae.

Antennae. Short; its peduncle is about as long as the scale. Scale reaches almost to the end of the 2nd segment of the 1st antennular peduncle and bears a small spine on the outer distal margin.

Thoracopods. 2nd pair only slightly longer than the 1st and 3rd in adults, but may be markedly longer in immatures. Merus setose on the posterior margin only; carpus bears long spines distally; propodus setose along the length of both margins; and dactyl armed with four or five very strong, long spines and several shorter ones. Dactyl and propodus together about as long as the carpus, and the extremely short dactyl is about as long as broad.

Abdomen. Lateral angles of segments acute. Dorsal keels in all segments, but not pronounced in the first two. Dorsal spines present in last three segments.

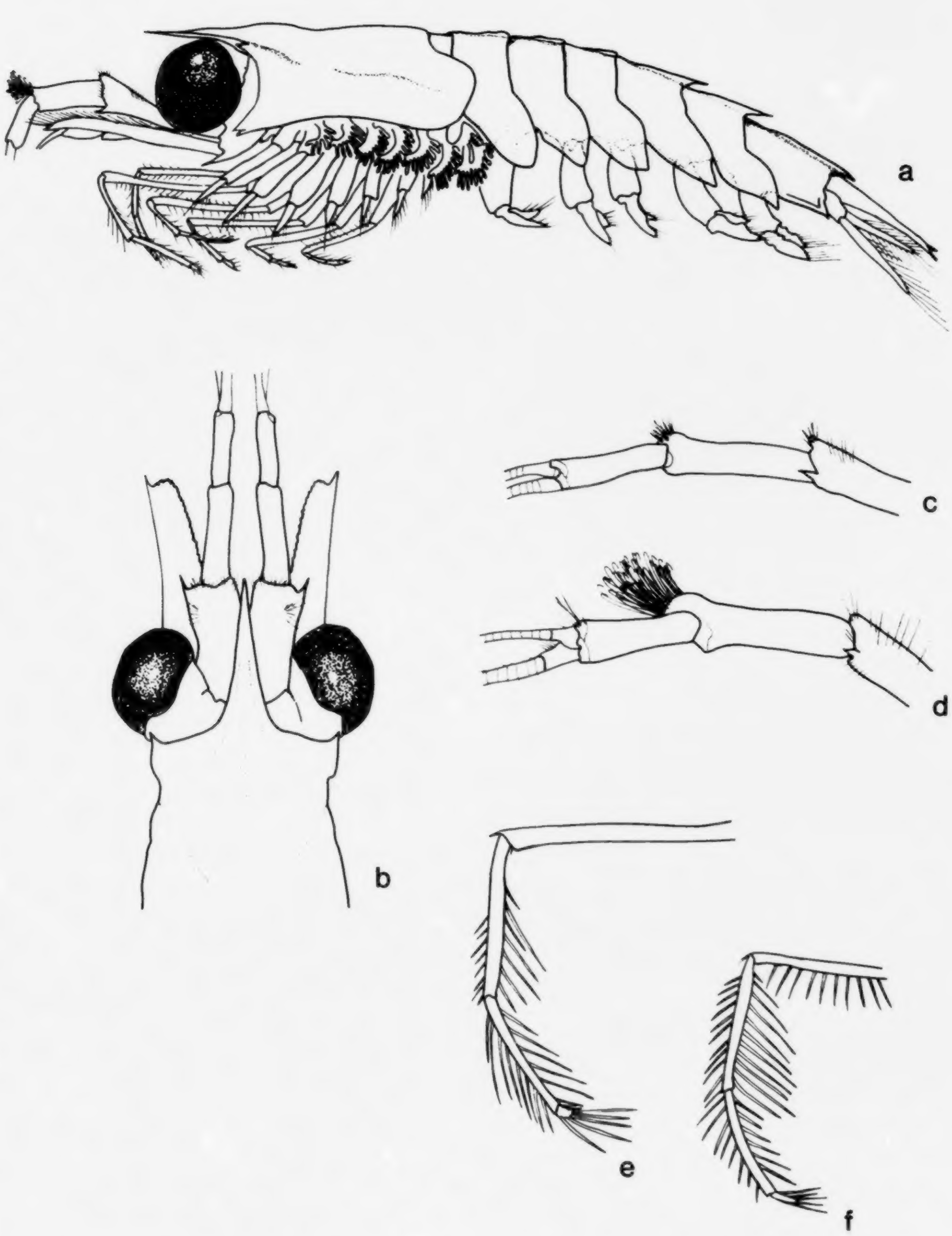
Petasma. Long, thin, strongly curved spiniform process. Terminal process short and thick; lateral process longer and thinner than the terminal, but generally resembles the terminal in appearance. Straight or slightly curved lateral process inserted in the median lobe slightly distal to the base of the proximal process. Median lobe truncate distally and has a small indentation on the distal margin.

TAXONOMIC NOTES Preanal spine shows slight sexual dimorphism. Juveniles may have slightly constricted eyes and elongated 2nd thoracopods.

ECOLOGICAL NOTES The breeding of Cassin's Auklets coincides with the plankton bloom in the NE Pacific (Triangle Island). T. spinifera and large copepods are the major food items taken by the adults to feed their young (10, 11, 12). It is also a dominant food item for baleen whales in eastern Aleutian Islands coastal waters (8), for blue, fin and humpback whales in the Gulf of Alaska (7), and for fish (6). Growth rates (and distributions) have been studied for the January -April period for the B.C. coast by (4).

DISTRIBUTION Reported only from the NE Pacific, from Baja California to the Gulf of Alaska, and occasionally from the Bering Sea. Usually found in less than 100 m of waters, but can live as deep as 300 m (7, 8). Fukuchi (3) found this species in salinities of 32.0-33.4 o/oo in the northern North Pacific, while (9) found it between 14.3 and 27.3 o/oo salinities in a B.C. inlet.

Figure. a. lateral view, male (2); b. dorsal view, anterior end, female (4); c. antennular peduncle, female (4); d. antennular peduncle, male (4); e. 2nd thoracopod, male (4); f. 2nd thoracopod, female (4).



Thysanoessa spinifera

Genus Thysanopoda Milne-Edwards, 1830

SYNONYMY AND REFERENCES

Thysanopoda Milne-Edwards, 1830

Boden et al., 1955 (1)	Guglielmo and Costanzo, 1977 (3)
Brinton, 1975 (2)	G.O. Sars, 1885 (4)

Parathysanopoda Illig, 1909 (*fide* Hansen, 1911)

CHARACTERIZATION (1, 2, 4)

Rostrum. Variable among species.

Carapace. With or without cervical grooves.

Antennules. Distal margin of 1st segment of the peduncle forms an elevated lobe (lappet). Flagella of antennules and antennae elongate.

Eyes. Round in adults.

Maxillae. Exopod very small.

Thoracopods. Similar in structure, none conspicuously elongated. Terminal segments of first two shortened, with brush-like setae. Endopod of 7th distinctly shorter than the preceding ones. Endopod of 8th rudimentary.

TAXONOMIC NOTES Difficulty of diagnosis encountered in differentiating between species of this genus has led to the study of both the thelycum and the petasma of adults of morphologically similar species (e.g., T. acutifrons and T. orientalis (3)).

Fourteen species are known (1); four have been found in our study area.

DISTRIBUTION Widespread throughout North and South Atlantic and Pacific, and Indian Oceans.

Thysanopoda acutifrons Holt and Tattersall, 1905

SYNONYMY AND REFERENCES

Thysanopoda acutifrons Holt and Tattersall, 1905

Boden et al., 1955 (1)
Brinton, 1962 (2)
Einarsson, 1945 (3)
non Frost, 1939
Hansen, 1908
Hansen, 1910
Hansen, 1911
Hansen, 1915
Ponomareva, 1963
Holt & Tattersall, 1906
non Illig, 1930
Mauchline, 1980 (4)
Mauchline & Fisher, 1969 (5)

Thysanopoda pectinata Hansen, 1905a

Ortmann, 1893
Fowler, 1903
Holt and Tattersall, 1905a

Thysanopoda johnstoni Sheard, 1942
Sheard, 1953 (*fide* Brinton, 1962)

Thysanopoda dubia Banner, 1950 (*fide* Brinton, 1962) (6)

CHARACTERIZATION (1, 3)

Rostrum. Shape is broadly triangular, with a pointed apex.

Carapace. No denticles present on the lateral margin.

Eyes. Small, brown in color.

Antennules. Outer distal angle of basal segment of peduncle bears small, strong spine; inner distal margin forms a setose triangular lobe extending 1/3 along 2nd segment; inner part of the anterior margin of 2nd segment carries rounded, spineless lobe.

Abdomen. No dorsal keels or spines.

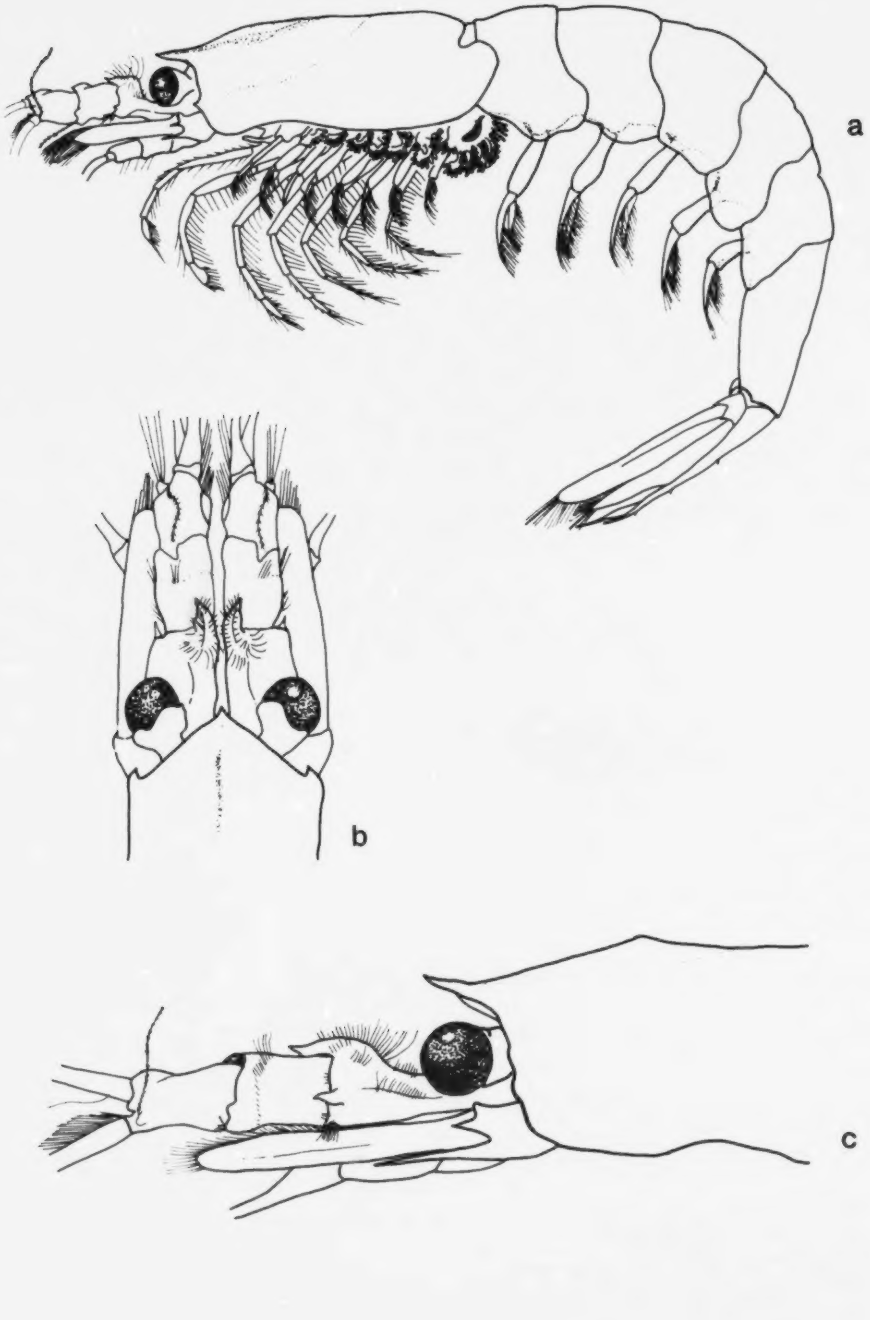
Petasma. Strongly curved spiniform process. Terminal process straight and long with a blunt rounded end. Sigmoid shaped proximal process about twice as long as the terminal process, and has a few teeth at the distal end. Lateral process tapers and hooks distally. 2-3 additional processes; first is spatulate and the others are slender. Median lobe ends acutely.

TAXONOMIC NOTES Larval specimens of *T. acutifrons* and *T. orientalis* are very similar. They can be distinguished on the basis of the larger size of *T. acutifrons* at analogous stages of development (2). The rostrum of *T. acutifrons* is longer and directed more forward than the rostrum of *T. orientalis* (1). The dorsal posterior margins of the 4th and 5th abdominal segments are slightly acuminate in *T. orientalis* but are not acuminate in *T. acutifrons*. Differences in the petasma also help differentiate the two species. Banner's (6) description of *T. dubia* was based on a female, probably immature. Males have never been found and juvenile females of *T. acutifrons* correspond well to the description of *T. dubia*; these two are probably synonymous (1, 2, 5). The carapace has no lateral denticles in adult and sub-adult specimens, but larvae and juveniles may have denticles (3).

ECOLOGICAL NOTES Food items include diatoms and crustaceans, and predators include whales and planktivorous fish (5).

DISTRIBUTION Reported from the Atlantic, Indian, and North and South Pacific. Locally found from California to Alaska. Banner (1) found large numbers off British Columbia from January to March. Caught in an open net towing 0-4000 m (2), but probably does not occur deeper than 700 m (E. Brinton, personal communication). Also occurrs at less than 200 m, usually during the night (5). The adults are usually found in waters between 3 and 6°C, and the larvae between 4 and 10°C (3).

Figure. a. lateral view, juvenile (3); b. dorsal view, anterior end, female (3); c. lateral view, anterior end, male (1).



Thysanopoda acutifrons

Thysanopoda cornuta Illig, 1905

SYNONYMY AND REFERENCES

Thysanopoda cornuta Illig, 1905

Banner, 1950 (1)
Boden et al., 1955 (2)
Brinton, 1953 (3)
Brinton, 1962 (4)
Brinton, 1975 (5)
Hansen, 1911
Hansen, 1912
Hansen, 1915 (6)
Illig, 1930 (7)
Komaki, 1960 (8)
Mauchline, 1980 (9)
Mauchline & Fisher, 1969 (10)
Tattersall, 1926
Tattersall, 1939 (12)

Thysanopoda insignis Hansen, 1905a

CHARACTERIZATION (1, 2, 5, 8)

Rostrum. Frontal plate broadly rounded, with a short upturned conical tooth at the apex.

Carapace. Prominent dorsal keel with short secondary crest at highest point; deep cervical groove connected with a more anterior lateral groove on the sides by a short longitudinal groove; longitudinal submarginal furrow parallels the lateral margin of the posterior 2/3 of the carapace.

Eyes. A small tubercle or papilla projects from the upper, inner corner of the eyestalks near the cornea. Eyes are small.

Antennules. Large, setose lobe of 1st segment of the peduncle extends forward beyond the mid-point of 2nd segment and ends in a short spine.

Abdomen. 4th and 5th segments bear dorsal and sub-dorsal keels, but no dorsal spines. 6th segment subequal to the 5th.

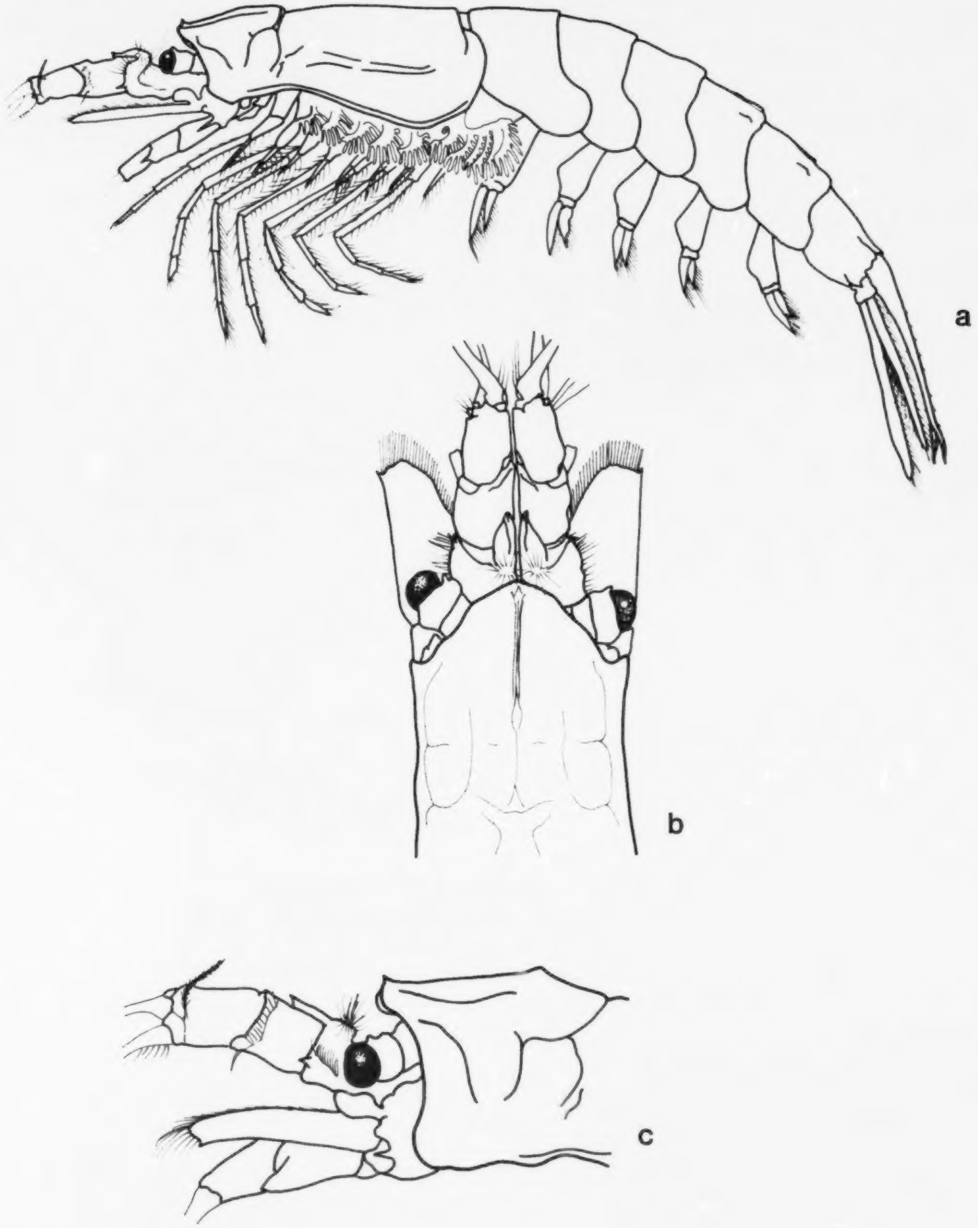
Petasma. Large spiniform process. Terminal and proximal processes are curved, nearly equal in length, somewhat dilated near the tip, and acutely pointed at the tip. Lateral process robust, strongly curved, and slightly longer than the spiniform process. Median lobe bears one or two small additional processes.

TAXONOMIC NOTES This species and *T. egregia* are readily distinguished from other euphausiids by the length of the 6th abdominal segment, which is subequal to the 5th. "Species B" larvae described by (1), (6), (7), (11) and (12) and thought to be *T. egregia* by (12) have been shown to be *T. cornuta* and possibly *T. spinicaudata* by (4). *T. cornuta* can also be distinguished from *T. egregia* by the upturned frontal plate with dorsal tooth at the tip. Fresh specimens of this species and *Bentheuphausia* are bright red (E. Brinton, personal communiction).

ECOLOGICAL NOTES Mainly predators, they consume diatoms, radiolarians, medusae, chaetognaths, crustaceans and fish (9). One of a few species in which individuals do not perform vertical migrations (9).

DISTRIBUTION A widely ranging bathypelagic species, it is one of the three most widely distributed euphausiid species (cf. Bentheuphausia amblyops and Stylocheiron maximum). Larvae usually occur between 700 and 2000 m, immatures near 1000 m or deeper and adults below 2000 m (4). It is widely distributed in the Pacific, with scattered findings in the Atlantic and Indian Oceans. Locally, most specimens occur in the Gulf of Alaska and off California (9, 10). The reported scarcity may be due to the limited depth range of most planktonic sampling surveys. They are also fast swimmers, able to escape most nets. They inhabit waters colder than 2-3°C (Bentheuphausia may also be found in these cold temperatures periodically) (3). The occurrence of T. cornuta may be correlated with closeness to seamounts, islands and continental slopes seaward of 3000 m (4).

Figure. a. lateral view, female (2); b. dorsal view, anterior end, female (8); c. lateral view, anterior end, female (8).



Thysanopoda cornuta

Thysanopoda egregia Hansen, 1905

SYNONYMY AND REFERENCES

Thysanopoda egregia Hansen, 1905
Boden et al., 1955 (1)
Brinton, 1953 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Hansen, 1911
Hansen, 1912 (5)
Illig, 1930 (6)
Mauchline, 1980 (7)
Mauchline & Fisher, 1969 (8)
Ponomareva, 1963
W. Tattersall, 1939 (9)
Zimmer, 1914 (10)

Thysanopoda megalops Illig, 1908 (*fide* Sheard, 1942)

CHARACTERIZATION (1, 2, 4)

Rostrum. Frontal plate thick and bent downwards, nearly straight across the anterior margin.

Carapace. Short additional crest at highest point of keel, with a lateral groove just below the keel. Distinct cervical groove, a longitudinal groove extending the length of the carapace just above the lateral margin, and a submarginal latitudinal furrow. There are no lateral denticles.

Eyes. Eyes small, with a small tubercle on the inner part of the eyestalk.

Antennules. Lobe on distal end of first segment of the peduncle is extremely setose; anterior margin of the lobe is concave and extends forward to cover the proximal part of the 2nd segment; outer, lower, distal margin of the first segment carries a small tooth. Basal part of the lower flagellum carries a tuft of long, silky setae, which is more dense in males than in females.

Abdomen. 6th segment is subequal to 5th. No dorsal spines, but dorsal keels and subdorsal spines occur on the 4th and 5th segments, and sometimes a subdorsal keel on the 6th.

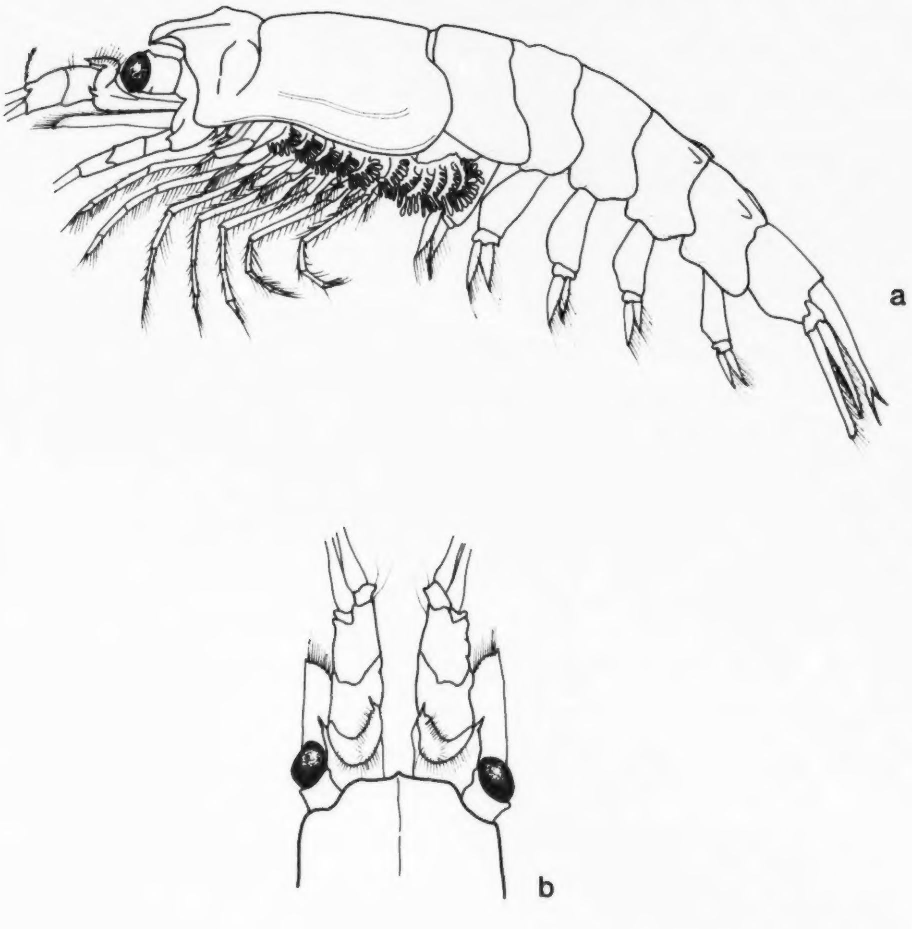
Petasma. Spiniform process is robust and slightly curved. Terminal and proximal processes are curved, slightly bent midway, and taper to acute tips. Lateral process is short, pointed and almost straight. Median lobe bears two additional processes - the one nearest the lateral process is similar to it, the second is slightly curved, slender and half the length of the lateral. The description by (3) may be of an immature specimen (E. Brinton, personal communication).

TAXONOMIC NOTES This species and T. cornuta are easily distinguished from other euphausiids by the length of the 6th abdominal segment, which is subequal to the 5th. Larval stages belonging to "Species A" were described by (9) and as T. cornuta by (5), (6) and (10); however, (3) has shown that all of these specimens (except one from (6)) are T. egregia. A series of developmental stages for T. egregia can be found at Scripps Institution of Oceanography (3). Sexual maturity occurs at approximately 60 mm (8) although this is uncertain. T. egregia can also be distinguished from T. cornuta by the downward projecting frontal plate without a dorsal spine.

ECOLOGICAL NOTES Mainly predators, they consume detritus, radiolarians, chaetognaths, molluscs, crustaceans and fish (7). This is one of a few species in which individuals do not perform vertical migrations (7).

DISTRIBUTION A wide ranging bathypelagic species (one of the 3 bathypelagic giant euphausiids - T. cornuta and T. spinicaudata), the adults of which inhabit depths greater than 2000 m. Larvae were found in greater numbers nearer the surface during the day, suggesting a reverse vertical migration (3). Most reports are from the North Pacific, with a few from the Atlantic and Indian Oceans; however, as more sampling below 2000 m occurs, it is likely this species will prove to be cosmopolitan (3, 8). Their scarcity may be due to the limited depth range of most planktonic surveys. They are also fast swimmers and may be able to escape most nets (2). They inhabit waters colder than 2-3°C (3).

Figure. a. lateral view, female (1); b. dorsal view, anterior end, female (1).



Thysanopoda egregia

Thysanopoda orientalis Hansen, 1910

SYNONYMY AND REFERENCES

Thysanopoda orientalis Hansen, 1910 (1)

Boden et al., 1955 (2)
Brinton, 1962 (3)
Brinton, 1975 (4)
Einarsson, 1942 (5)
Hansen, 1912 (6)
Mauchline, 1980 (7)
Mauchline & Fisher, 1969 (8)
Ponomareva, 1963

CHARACTERIZATION (1, 2, 4)

Rostrum. Short forward- and upward-pointing tooth situated at apex of thick, broadly rounded frontal plate. In immature specimens (about 15-23 mm) the rostral process, seen laterally, is long, spiniform, and more anteriorly directed than in adults.

Carapace. No denticles on lateral margin.

Eyes. Small to medium sized; dark brown to brownish-black; round.

Antennules. Lobe at distal end of 1st peduncular segment is abruptly elevated, continuing high over proximal portion of 2nd segment and ending as an acute angle, the lower edge of which drops off sharply to the upper surface of 2nd segment. Dorsal distal margin of 2nd segment extends over proximal surface of 3rd segment.

Abdomen. No dorsal spines or keels, but the dorsal posterior margins of 4th and 5th segments are slightly acuminate. 6th segment longer than 5th.

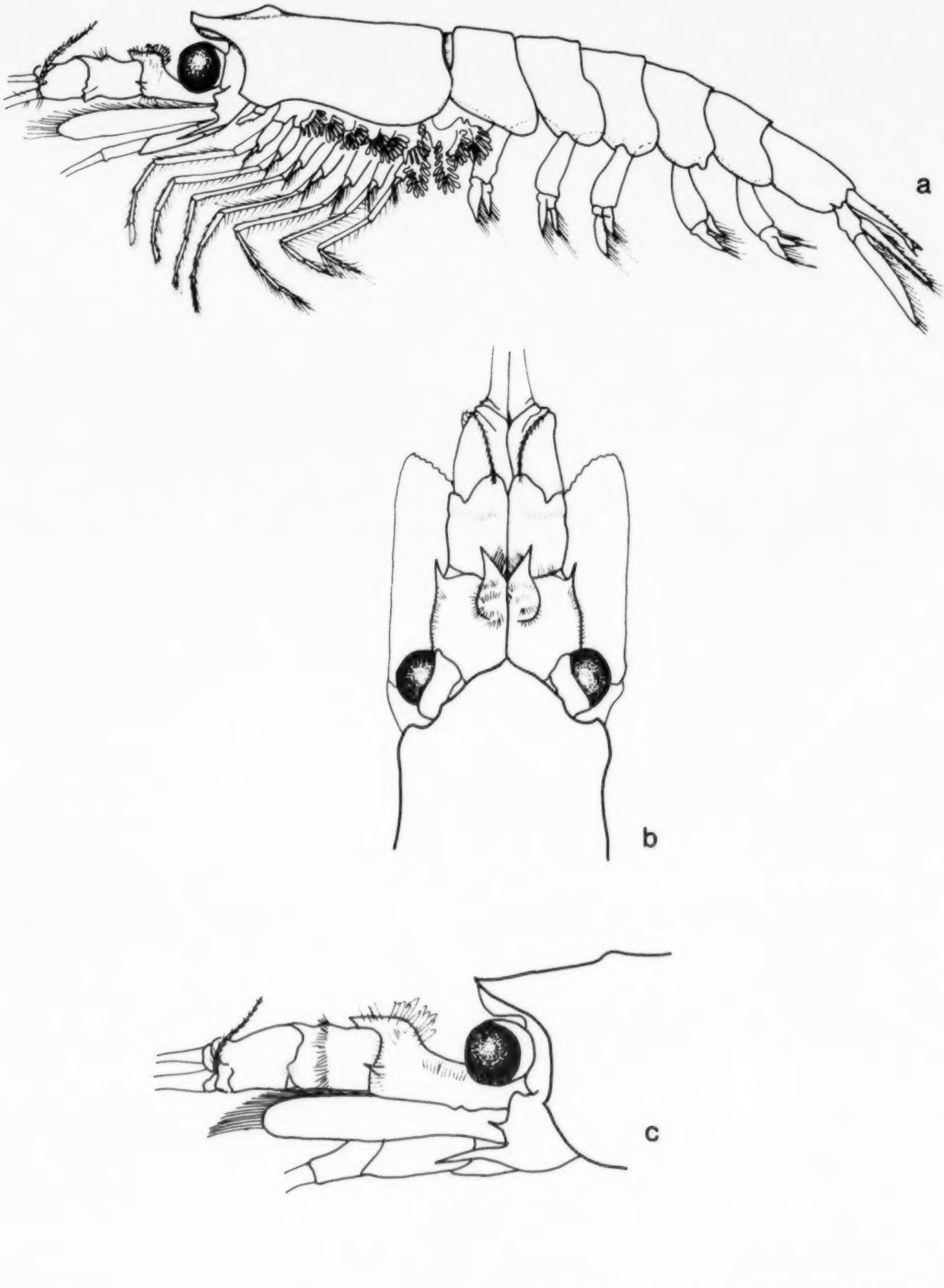
Petasma. Slender, curved spiniform process. Long, straight terminal process ends in a bluntly rounded spoon-shaped lobe. Proximal process, almost twice as long as the terminal process, curves distally to a semi-circle, with a few teeth at the end. Long lateral process tapers and is hooked distally. 2-3 additional processes: one spatulate and others short and spiniform. Median lobe ends acutely.

TAXONOMIC NOTES This species is closely allied to *T. acutifrons*. Larval specimens of the two are very similar but can be distinguished on the basis of the larger size of *T. acutifrons* at analogous stages of development (3). Rostrum in *T. orientalis* is slightly shorter than in *T. acutifrons*. The slightly acuminate 4th and 5th abdominal segments in *T. orientalis* are not found in *T. acutifrons*. The petasma will also help differentiate these two species. Considered varieties of the same species by (5). Although a lateral denticle on the carapace is absent in adults but present in juveniles, Talbot (1974; as cited in 7) found an adult female with one denticle.

ECOLOGICAL NOTES This species shows a diurnal vertical migration (8). Eaten by planktivorous fish, it is a predator, eating mostly crustaceans (7).

DISTRIBUTION Mesopelagic, in all oceans. While *T. acutifrons* is bi-boreal, *T. orientalis* inhabits tropical and sub-tropical waters, generally between 40°N and 40°S (8). Usually occurs below 400 m, although larvae have been found above 200 m (2). Reported from California but not further north in the NE Pacific.

Figure. a. lateral view, female (2); b. dorsal view, anterior end, female (1); c. lateral view, anterior end (1).



Thysanopoda orientalis

Index to Scientific Names (Euphausiacea)

aberdonensis, Thysanoessa; see Thysanoessa inermis
acutifrons, Thysanopoda 263, 265, 352, 411
amblyops
  Bentheuphausia 263, 382
  Thysanopoda; see Bentheuphausia amblyops
armata, Thysanoessa; see Thysanoessa longipes

Bentheuphausia 263, 281
  amblyops 263, 282
boopis
  Nematobrachion 263, 298, 408
  Nematodactylus; see Nematobrachion boopis
borealis, Thysanoessa; see Thysanoessa inermis
Boreophausia
  inermis; see Thysanoessa inermis
  raschii; see Thysanoessa raschii

chelifer, Stylocheiron; see Stylocheiron abbreviatum
cornuta, Thysanopoda 263, 265, 356, 411

difficilis, Nematoscelis 275, 306, 408
dubia, Thysanopoda; see Thysanopoda acutifrons

egregia, Thysanopoda 263, 265, 360, 411
Euphausia 263, 285, 407
  gibboides 269, 286, 407
  inermis; see Thysanoessa inermis
  mutica 269, 283, 407
  pacifica 263, 269, 290, 407
  raschii; see Thysanoessa raschii
  recurva 269, 294, 407

flexipes
  Nematobrachion 263, 300, 408
  Nematodactylus; see Nematobrachion flexipes
  Stylocheiron; see Nematobrachion flexipes

gibboides, Euphausia 269, 286, 407
gregaria, Thysanoessa 273, 328, 410

inermis
  Boreophausia; see Thysanoessa inermis
  Euphausia; see Thysanoessa inermis
  Rhoda; see Thysanoessa inermis
  Thysanoessa 273, 332, 410
  Thysanopoda; see Thysanoessa inermis
insignis, Thysanopoda; see Thysanopoda cornuta
inspinata, Thysanoessa 273, 336, 410

jardineana, Rhoda; see Thysanoessa raschii
johnstoni, Thysanopoda; see Thysanopoda acutifrons

longicorne, Stylocheiron 263, 277, 318, 409
longipes, Thysanoessa 273, 340, 410

mantis, Nematoscelis; see Nematoscelis tenella
mastigophorum, Stylocheiron; see Thylocheiron longicorne
maximum, Stylocheiron 263, 277, 320, 409
megalops
  Nematoscelis; see Nematoscelis difficilis
  Thysanopoda; see Thysanopoda egregia
microps, Nematoscelis; see Nematoscelis difficilis
mutica, Euphausia 269, 288, 407

neglecta, Thysanopoda; see Thysanoessa inermis
Nematobrachion 263, 297, 408
  boopis 263, 298, 408
  flexipes 263, 300, 408
Nematodactylus; see Nematobrachion
  boopis; see Nematobrachion boopis
  flexipes; see Nematobrachion flexipes
Nematoscelis 263, 305, 408
  difficilis 275, 306, 408
  mantis; see Nematoscelis tenella
  tenella 275, 310, 408

oculata, Tessarabrachion; see Tessarabrachion oculatum
oculatum, Tessarabrachion 263, 324, 409
oculatus, Tessarabrachion; see Tessarabrachion oculatum
orientalis, Thysanopoda 263, 265, 364, 411

pacifica, Euphausia 263, 269, 290, 407
Parathysanopoda; see Thysanopoda
pectinata, Thysanopoda; see Thysanopoda acutifrons

raschii
  Boreophausia; see Thysanoessa raschii
  Euphausia; see Thysanoessa raschii
  Rhoda; see Thysanoessa raschii
  Thysanoessa 273, 344, 410
  Thysanopoda; see Thysanoessa raschii
recurva, Euphausia 269, 294, 407
Rhoda
  inermis; see Thysanoessa inermis
  jardineana; see Thysanoessa raschii
  raschii; see Thysanoessa raschii

spinifera, Thysanoessa 273, 346, 410
Stylocheiron 263, 409
  flexipes; see Nematobrachion flexipes
  longicorne 263, 277, 318, 409
  mastigophorum; see Stylocheiron longicorne
  maximum 263, 277, 320, 409
  suhmii; see Stylocheiron longicorne
suhmii, Stylocheiron; see Stylocheiron longicorne

tenella, Nematoscelis 275, 310, 410
Tessarabrachion 263, 323, 409
  oculata; see Tessarabrachion oculatum
  oculatum 263, 324, 409
  oculatus; see Tessarabrachion oculatum
Thysanoessa 263, 327, 410
  aberdonensis; see Thysanoessa inermis
  armata; see Thysanoessa longipes
  borealis; see Thysanoessa inermis
  gregaria 273, 328, 410
  inermis 273, 332, 410
  inspinata 273, 336, 410
  longipes 273, 340, 410
  neglecta; see Thysanoessa inermis
  raschii 273, 344, 410
  spinifera 273, 346, 410
Thysanopoda amblyops; see Bentheuphausia amblyops
Thysanopoda 263, 351, 411
  acutifrons 263, 265, 352, 411
  cornuta 263, 265, 356, 411
  dubia; see Thysanopoda acutifrons
  egregia 263, 265, 360, 411
  inermis; see Thysanoessa inermis
  insignis; see Thysanopoda cornuta
  johnstoni; see Thysanopoda acutifrons
  megalops; see Thysanopoda egregia
  neglecta; see Thysanoessa inermis
  orientalis 263, 265, 364, 411
  pectinata; see Thysanopoda acutifrons

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APPENDIX A

List of Specimens Used for Verifications

Our descriptions and illustrations are generally based on published material, but some specimens were also examined to verify selected characters and for original illustrations as indicated. The source, catalogue number, approximate collecting locality, identifier, and label binomen, if different, are included below.

AHF = Allan Hancock Foundation; BCPM = British Columbia Provincial Museum; CAS = California Academy of Science; DST = Dobrocky SeaTech; EVS = E.V.S. Consultants; KML = Khoyatan Marine Laboratory; MOLML = Moss Landing Marine Laboratory; NMC = National Museums Canada; PBS = Pacific Biological Station; USNM = United Statess National Museum of Natural History; UW = University of Washington; VPA = Vancouver Public Aquarium.

Mysidacea

"*Acanthomysis*" *columbiae*
USNM 82413; Monterey Bay, CA; W.M. Tattersall *Acanthomysis*
MLML July 83; Seabird Rocks, Pachena Bay, BC; W.C. Austin
VPA J. Marliave; Georgia Strait, B.C; W.C. Austin

"*Acanthomysis*" *stelleri*
NMC-C-1984-927; Puget Bay, AK; C. Holmquist
USNM 82463; Bering Sea; W.M. Tattersall *Acanthomysis*

Alienacanthomysis macropsis
NMC-C-1984-941; Dixon Harbor, AK; C. Holmquist
VPA J. Marliave; Nelson Island, B.C; W.C. Austin

Amblyops abbreviata
USNM 82566; off Vineyard Sound, MA; W.M. Tattersall

Archaeomysis grebnitzkii
CAS 056180; San Juan Island, WA; W. Clarke

Boreomysis arctica
USNM 82700; off New Jersey; W.M. Tattersall

Boreomysis californica
AHF Stat. no. 9661; San Nicholas Island, CA; J. Chapman
USNM 82707; Bogoslof Island, AK; W.M. Tattersall

Boreomysis rostrata complex
USNM 826; Yunaska Island; W. Tattersall *B. rostrata*?

Columbiaemysis ignota
MLML; Pachena Bay, BC; W.C. Austin

Eucopia australis
AHF St. 9863; Catalina Island, BC; J. Chapman
USNM 32348; SW of Pribyloff Island, AK; no identifier given
AHF St. 8884; Santa Catalina Island, CA; J. Chapman

Eucopia grimaldii
USNM 89737; Cape St. James, BC; W.M. Tattersall *Eucopia unguiculata*

Exacanthomysis alaskensis
NMC-C-1984-930; Goshen Island, BC; C. Homquist
USNM 189309; Little Port Walter, AK; C. Holmquist

Exacanthomysis davisi
NMC-C-1984-931; Puget Sound, WA; R.L. Downey

Gnathophausia gigas
BCPM 979-11255-6; off Brooks Peninsula, BC; J. Green/W.C. Austin
BCPM 983-1650-1; off Brooks Peninsula, BC; J. Green/W.C. Austin
BCPM 979-11257-2; Ocean Stat. Papa, BC; J. Green/W.C. Austin
BCPM 979-11244-1; Ocean Stat. Papa, BC; J. Green/W.C. Austin
BCPM 979-11250-6; Ocean Stat. Papa, BC; J. Green/W.C. Austin

Gnathophausia ingens
AHF Stat. 10973; no locality, CA?; J. Chapman
USNM 98155; Gulf of Mexico; F.A. Chace
AHF Stat. 8510-63; Santa Catalina Island, CA; "P.H.B."

Heteromysis odontops
NMC-C-1984-932; Victoria BC; E.L. Bousfield

Holmesimysis costata
NMC-C-1094-933; Sooke Basin; C. Holmquist

Holmesimysis nuda
NMC-C-1984-934; Copper Bay, Moresby Island, BC; C. Holmquist

Holmesimysis nudensis
NMC-C-1984-942; Yakan Point, BC; C. Holmquist

Holmesimysis sculpta
NMC-C-1984-935; Peril Bay, BC; C. Holmquist

Holmesimysis sculptoides
NMC-C-1984-943; Shipwreck Point, WA; C. Holmquist

Inusitatomysis insolita
AHF Stat. 1018-39; San Clemente Island, CA; J. Chapman
AHF Stat. 24494-6C; 34°N, 118°W, CA; J. Chapman

Meterythrops robusta
USNM 82386; 54°N, 166°W, AK; W.M. Tattersall

Mysis relicta
USNM 62588; Lake Erie, OH; C.B. Wilson

Neomysis kadiakensis
USNM 81238; San Francisco Bay, CA; W.M. Tattersall

Neomysis mercedis
NMC-C-1984-938; Broughton Island, BC; C. Holmquist
EVS Stat. 4, 5, 7; Campbell River, B.C; W.C. Austin

Neomysis rayi
NMC-C-1984-939; Muchalat Inlet, BC; R.L. Downey
EVS Stat. 37; Campbell River, B.C; W.C. Austin

Pacifacanthomysis nephrophthalma
CAS 056179; San Nicholas Island, CA; W. Clarke
CAS 056183; North of Point Sal, CA; W. Clarke

Petalophthalmus armiger
USNM 82425; Bering Island, AK; W.M. Tattersall

Proneomysis wailesi
CAS 056182; Coronado Island, Baja, CA; W. Clarke
VPA J. Marliave; Georgia Strait, B.C; W.C. Austin

Pseudomma truncatum
UW; West Point, WA; K. Li

Pseudomma species aff. *truncatum*
USNM 13639; 63°N, 167°W, AK; W.M. Tattersall *P. truncatum*

Stilomysis grandis
BCpM 975-72-19; Port San Juan, BC; W.C. Austin

Xenacanthomysis pseudomacropsis
EVS Stat. 5, 37; Campbell River, B.C; W.C. Austin
USNM 82523; Bering Sea; W.M. Tattersall *Acanthomysis*
VPA J. Marliave; Georgia Strait, B.C; W.C. Austin

Euphausiacea

All species except *Nematoscelis tenella* were examined from the collection of J. Fulton, PBS.

APPENDIX B

Additional Information on Mysid Morphology and Identification

Examine mysids alive, where possible, noting the color of the body, eyes and appendages. Deep sea species are often some shade of red; however, many shallow water species change color depending on background and light intensity. These factors influence the distribution of pigments within branching chromatophores under the integument. Kill and fix in 5% buffered formalin followed by preservation in 70% ethyl alcohol.

Several taxonomic characters may vary with sex and maturity. Initially, examine the largest members of the sample including both males and females. Intersexes have been reported (Mauchline, 1980). Most sex related characters are noted below. In summary they may include: position of genital pores; presence of male papillae or pores; female marsupium; antennular structures related at least in part to copulatory behavior; form and number of pleopods; pseudobranchia in males; sternal processes and hair tufts in one or both sexes; and even differences in the shape and spination of the telson (e.g., Acanthomysis dimorpha Ii, 1964). Juveniles of closely related species may not be distinguishable. Larvae released from the marsupium have the general appearance of adults in miniature. The greatest differences in juvenile body form occur in the Lophogastrida including local species of Gnathophausia, where carapace spines are greatly elongated relative to those in adults. Juveniles lack one or more secondary sexual characteristics, including a marsupium in females. However, some adult females of Arctic species produce a marsupium reduced in size after a molt following release of their young. It follows that for some species an assessment of maturity should not be based on the full development of a marsupium.

Appendages are often lost during collection or preservation. Determine obvious losses during initial sorting. Also, aberrant individuals may have malformed structures, either genetically determined or environmentally induced. Regenerated appendages may differ in form or size.

Most shallow water mysids range from 5 to 20 mm in length but deep water species often reach 50 to 70 mm long and one species, Gnathophausia ingens, may grow to over 300 mm in length. Unless otherwise stated, the sizes given in this handbook are based on measurements from the anterior margin of the carapace, excluding the rostrum, to the tip of the telson.

The structures noted below are those considered most useful for identification. They are defined in the glossary and are illustrated on page 28 and/or on the following pages.

Carapace. All mysids have a well developed carapace but it ranges in extent from a relatively small structure just reaching the last thoracic segment and the bases of the legs to a large shield extending back to the second abdominal segment and down over the bases of the legs. It is attached on the head and on the first three to four thoracic somites. In all mysids it is characterized by a cervical sulcus toward the anterior end. The form of the anterolateral margin (e.g., rounded, angular, spined), may be diagnostic. A rostrum may be well developed or absent. Additional projections, spines, tubercles, and/or keels are present in a relatively few species but may be diagnostic.

Antennules. Each antennular peduncle carries two multiarticulate flagella which may be similar or dissimilar in size. The outer flagellum is often more robust and more heavily armed in males. The peduncle is three segmented and in males of the large family Mysidae carries an additional lobe, the appendix masculina, typically covered with long, curling bristles.

Antennae. Segmentation in the antennal peduncle is often obscure but comprises 3 segments in at least some groups. The endopod is in the form of a single multiarticulate flagellum which may be larger or smaller than the antennal flagella. An antennal scale is present in all but one local genus. The shape, length and spines are often diagnostic. Plumose setae may fringe all or portions of the scales. These are not illustrated in this handbook but their presence may be inferred from a ruffled margin. A small distal suture is present in many genera but may be difficult to see with reflected light.

Eyes. The paired eyes are on occular peduncles and are movable where a faceted cornea and lens are present. An occular papilla is often developed on the dorsal side of the stalk near the cornea. The shape and size of the cornea may be diagnostic although some intraspecies variation in size may occur. In a few genera the visual elements of each eye are divided in two. In certain cave and deep sea species the eye is reduced to varying degrees, sometimes to a plate-like or spine-like structure.

Labrum. This forms a flat plate typically rounded posteriorly and either rounded or pointed anteriorly. In one local species it is divided posteriorly into two unequal lobes.

Mandibles. Portions of the opposing mandibular surfaces, the gnathobases, may include cutting, grinding and macerating regions which are in part asymmetrical. A lacinia mobilis occurs on the left mandible in certain groups. While differences in structure may be diagnostic they are not employed in these keys. The mandibles are uniramous, each having a palp extending forward. In one local species these palps are greatly enlarged as prehensile structures extending beyond the antennae and antennules.

Labium. This lower lip is divided ventrally into two lobes, the paragnaths, which lie against the posterior face of the mandibles. In ventral view they may be covered by the maxillules and maxillae. Like the mandibles they are typically asymmetrical.

Maxillules. These are typically the smallest set of appendages associated with feeding and may not be visible in ventral view until the maxillae are lifted aside. Each has two lobes, a proximal and distal endite with spines. In one genus a segmented endopod is directed posteriorly. In one subfamily the spines increase in size along the distal endite. Otherwise the form varies little other than the relative development of spines and setae.

Maxillae. The paired maxillae overall appear as foliaceous fringed plates overlying the mouth. Each plate typically includes 2 to 3 proximal lobes, an anterior short endopod, and a lateral flattened epipod.

Thorax. Four of the eight thoracic somites, or thoracomeres, are free from the carapace, although none or only one or two may be visible externally.

Gonopores. As in other malacostracans the oviducts open ventrally adjacent to the 6th pair of thoracopods, while the male genital organs are located ventrally adjacent to the 8th pair of thoracopods. These male structures range from short, conical genital papillae, to long tubular penes, extending forward almost to the mouth.

Sternal processes. Knobs, spines, fingerlike processes and hair tufts may occur on the ventral side of the thorax on one or more sternal plates. These may occur in only one sex.

Thoracopods. All mysids carry 8 pairs of thoracic limbs. The thoracopods are typically biramous with an outer exopod (sometimes missing on the 1st and 2nd thoracopod), and an inner endopod. These arise from a protopod typically comprised of three segments: a precoxa (absent on the 1st thoracopod), a coxa and a basis. The exopod typically consists of a large flattened segment bearing a multiarticulate, setous flagellum adapted for swimming. The endopod basically consists of six segments: preischium (or metabasis), ischium, merus, carpus, propodus (or propus), and dactyl. The dactyl may carry an apical spine or nail. One or more of the thoracopods may be chelate or subchelate.

Thoracopod 1. The exopod is reduced to a plate in some species, is limited to only a knob in others and is missing in still others. The exopod is also missing in one local species. The endopod is always bent over the mouth region. It is short and robust with the carpus and propodus fused to form a carpo-propodus. The dactyl carries an apical spine. The endopod is sometimes subchelate. A large lamellar epipod extends up under the carapace.

Thoracopod 2. This appendage may differ little from remaining thoracopods in some species but in others may be shorter, with the carpus and propodus fused, and the dactyl rounded, mitten shaped, and with a dense covering of setae. The exopod is well developed except in one local species where it is absent.

Thoracopods 3-8. These appendages may be similar or dissimilar, some enlarged or reduced. The exopod is almost always well developed. The endopod with few exceptions (none local) is also well developed. In some groups the carpus and propodus may be fused, often with a secondary subdivision into 5-20 or more subsegments. The number may be diagnostic. This carpo-propodus has sometimes been referred to as simply the propodus (e.g., Banner, 1948b; W. Tattersall, 1932). Holmquist in at least some papers (1982) includes the dactyl within the term carpo-propodus. The presence of an oblique rather than a transverse articulation between the carpus and propodus is diagnostic for one large tribe.

Gills. These are present in only two deep water families where they occur on or adjacent to thoracopods 2-7 or 2-8. They are composed of four pinnate branches.

Marsupium. The marsupium or brood pouch on the ventral surface of all adult females is formed by 2, 3, or 7 interlocking pairs of oostegites. The number, form and relative size may be diagnostic.

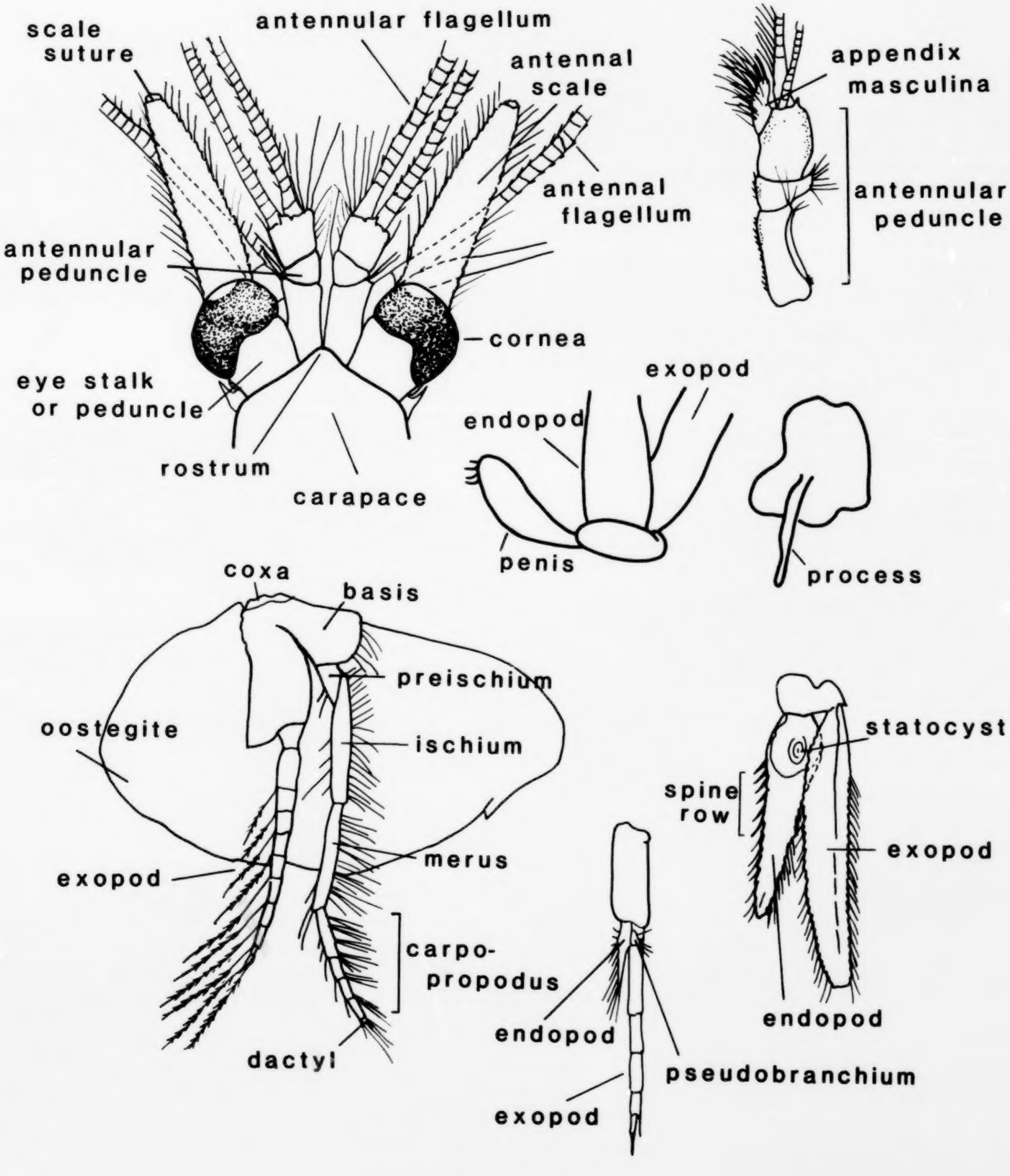
Abdomen. There are six evident abdominal somites or pleomeres as in other malacostracans. The 6th is the longest and may represent a fusion of two somites. Integumental sculpturing is used as a diagnostic character for several local species.

Pleural plates. Epimeres extending ventro-laterally from the abdominal tergites rarely occur in the mysids but where they do occur may be diagnostic.

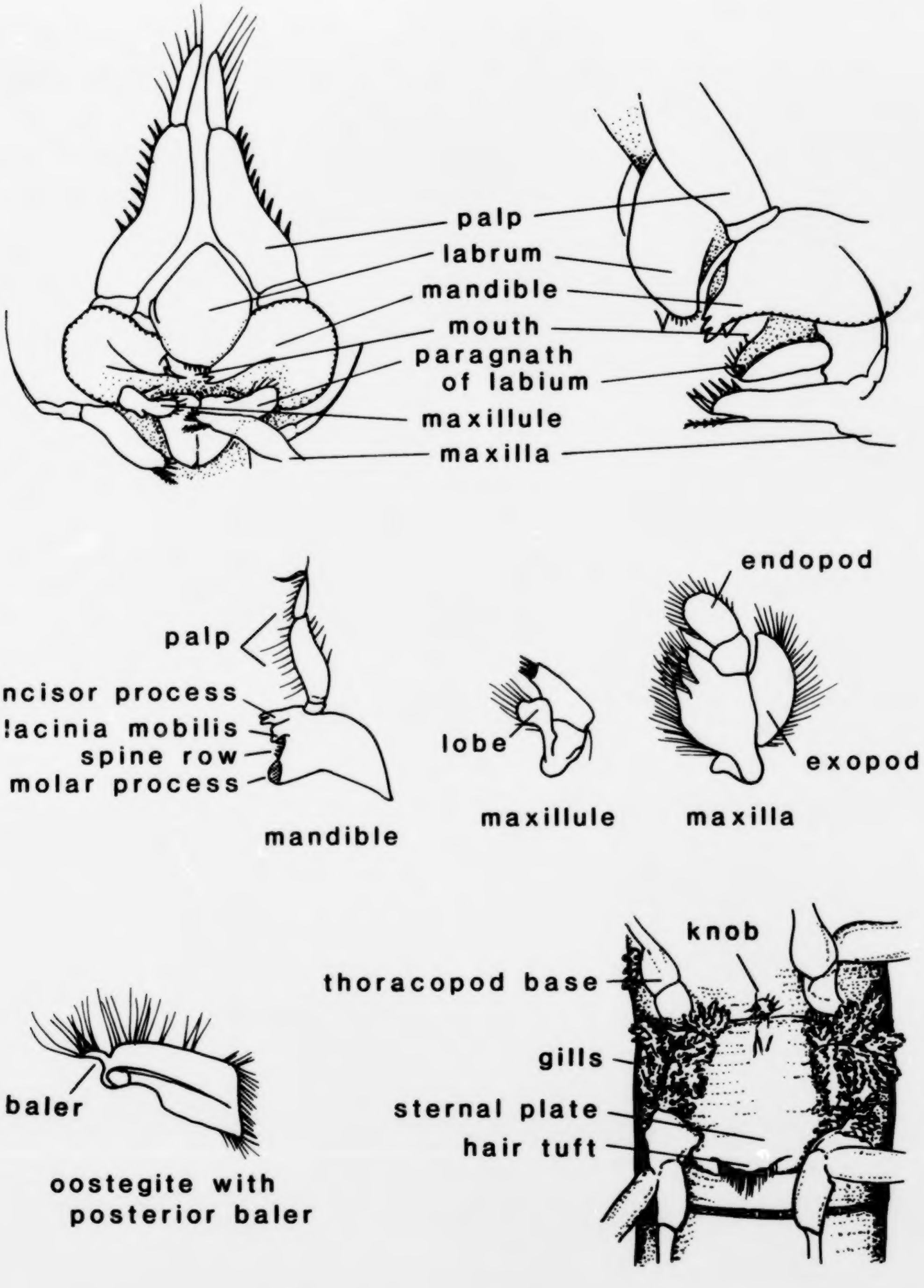
Pleopods. These may be present on the first 5 abdominal somites. Where fully developed they consist of a protopod of coxa and basis supporting two multiarticulate, plumose rami. Reductions varying from a few segments to unsegmented plates occur in the females of most species. Less marked reductions ocurr in males of some groups. Alternatively, certain pleopods, gonopods, typically the 3rd and/or 4th pair, may be greatly elongated and armed with modified peglike setae in the males of certain groups. The gonopods may reach full development only in the largest "mature" individuals. Pseudobranchia of varying shape may occur near the base of the endopods in some males.

Uropods. These form a tail fan together with the telson. The single segmented protopod bears an exopod and endopod, both dorso-ventrally flattened. A complete or partial articulation or a suture occurs near the apex of the endopod or exopod in some groups. The setation and spination on the uropods are often diagnostic; however, spines on the ventral surface of the endopod may be difficult to see. A statocyst occurs near the base of each endopod in all mysids except certain groups restricted to deep water.

Telson. This is dorso-ventrally flattened. The shape, apex, spination and setation vary considerably and are important diagnostic characters. A pair of terminal plumose setae occurs in a number of groups but are easily lost during collection or preservation.


scale suture
antennular flagellum
antennal scale
appendix masculina
antennal flagellum
antennular peduncle
antennular peduncle
cornea
eye stalk or peduncle
rostrum
carapace
exopod
endopod
penis
process
coxa
basis
preischium
oostegite
ischium
statocyst
spine row
exopod
merus
exopod
carpo-propodus
endopod
dactyl
endopod
pseudobranchium
exopod

Detailed morphological characters of mysids


palp
labrum
mandible
mouth
paragnath of labium
maxillule
maxilla
palp
incisor process
lacinia mobilis
spine row
molar process
lobe
endopod
exopod
baler
knob
thoracopod base
gills
sternal plate
hair tuft

mandible

maxillule

maxilla

oostegite with posterior baler

Detailed morphological characters of mysids

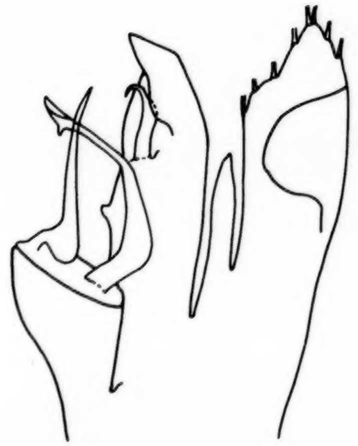
APPENDIX C

Petasmae of Euphausiids from the Northeast Pacific

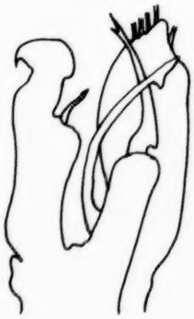
Petasmae were redrawn as follows:

Boden et al., 1955:	*Euphausia* (all species)
	Nematobrachion (all species)
	Tessarabrachion oculatum
	Thysanoessa gregaria
	Thysanoessa raschi
	Thysanoessa spinifera
	Thysanopoda (all species)
Brinton, 1975:	*Stylocheiron* (all species)
Einarsson, 1945:	*Thysanoessa inermis*
Gopalakrishnan, 1975:	*Nematoscelis* (all species)
Nemoto, 1963:	*Thysanoessa inspinata*
Nemoto, 1966:	*Thysanoessa longipes*

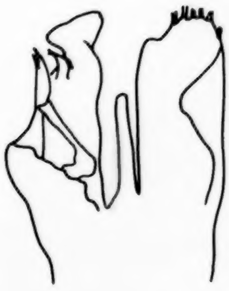
Euphausia



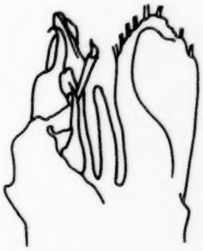
E. gibboides



E. mutica

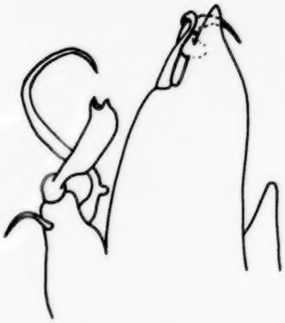


E. recurva

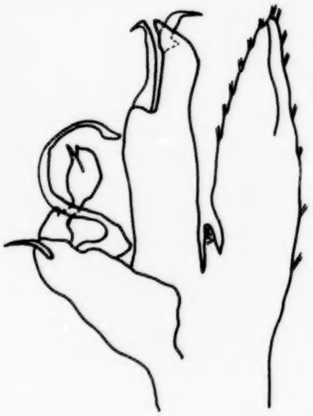


E. pacifica

Nematobrachion

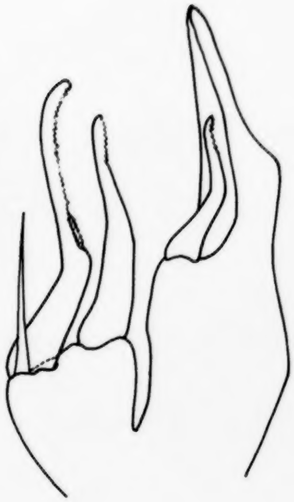


N. boopis

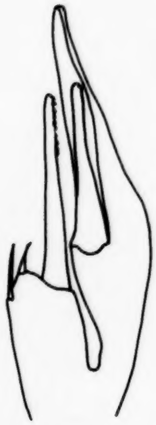


N. flexipes

Nematoscelis

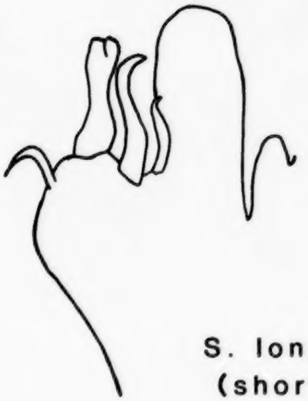


N. difficilis

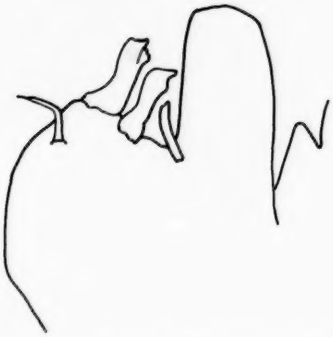


N. tenella

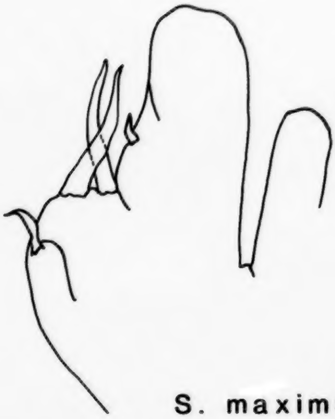
Stylocheiron, Tessarabrachion



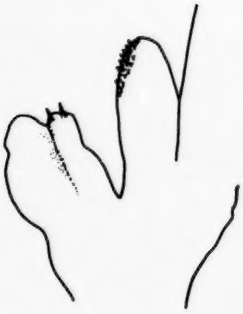
S. longicorne
(short form)



S. longicorne
(long form)

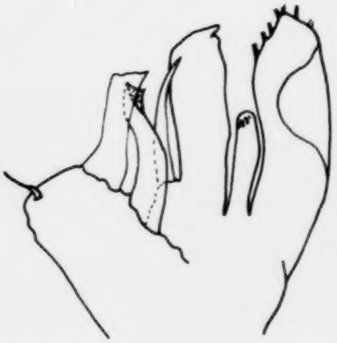


S. maximum

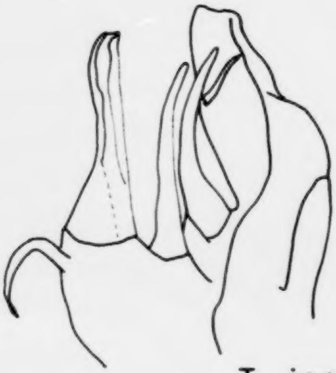


T. oculatum

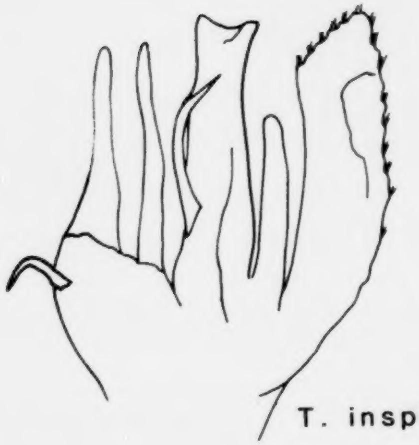
Thysanoessa



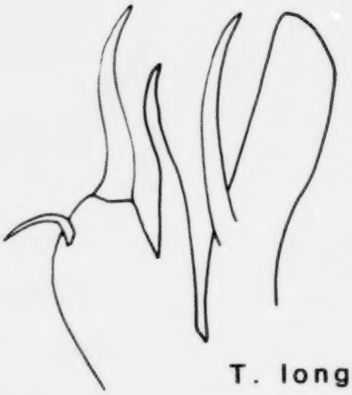
T. gregaria



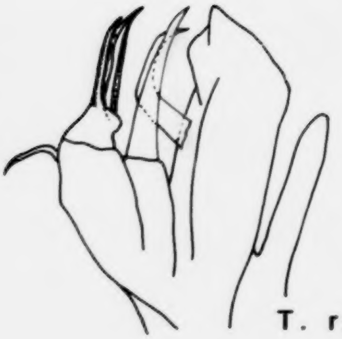
T. inermis



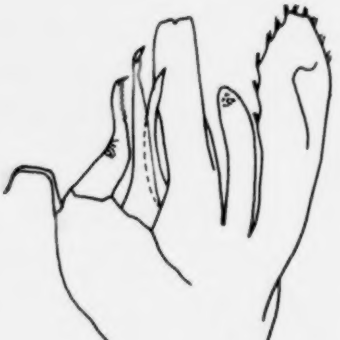
T. inspinata



T. longipes

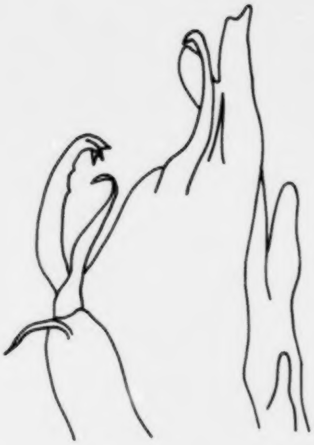


T. raschi

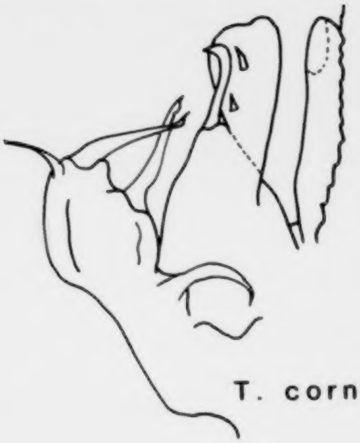


T. spinifera

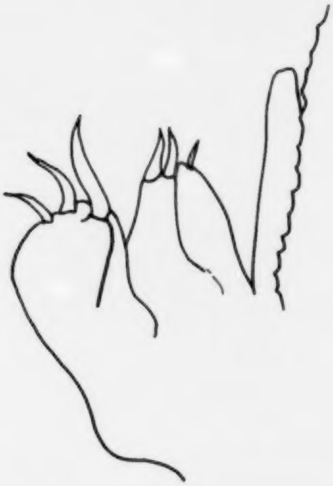
Thysanopoda



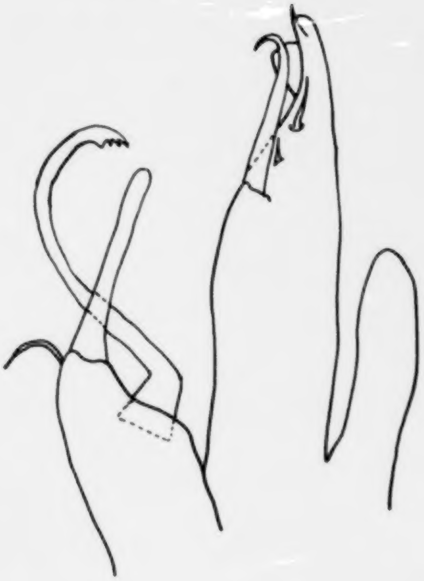
T. acutifrons



T. cornuta



T. egregia



T. orientalis